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E. J. Mann

UNITED STATES DEPARTMENT OF AGRICULTURE

AGRICULTURAL RESEARCH SERVICE

ANIMAL HUSBANDRY RESEARCH DIVISION

and

COOPERATING SOUTHERN STATES

1965-1966 Annual Report of S-10

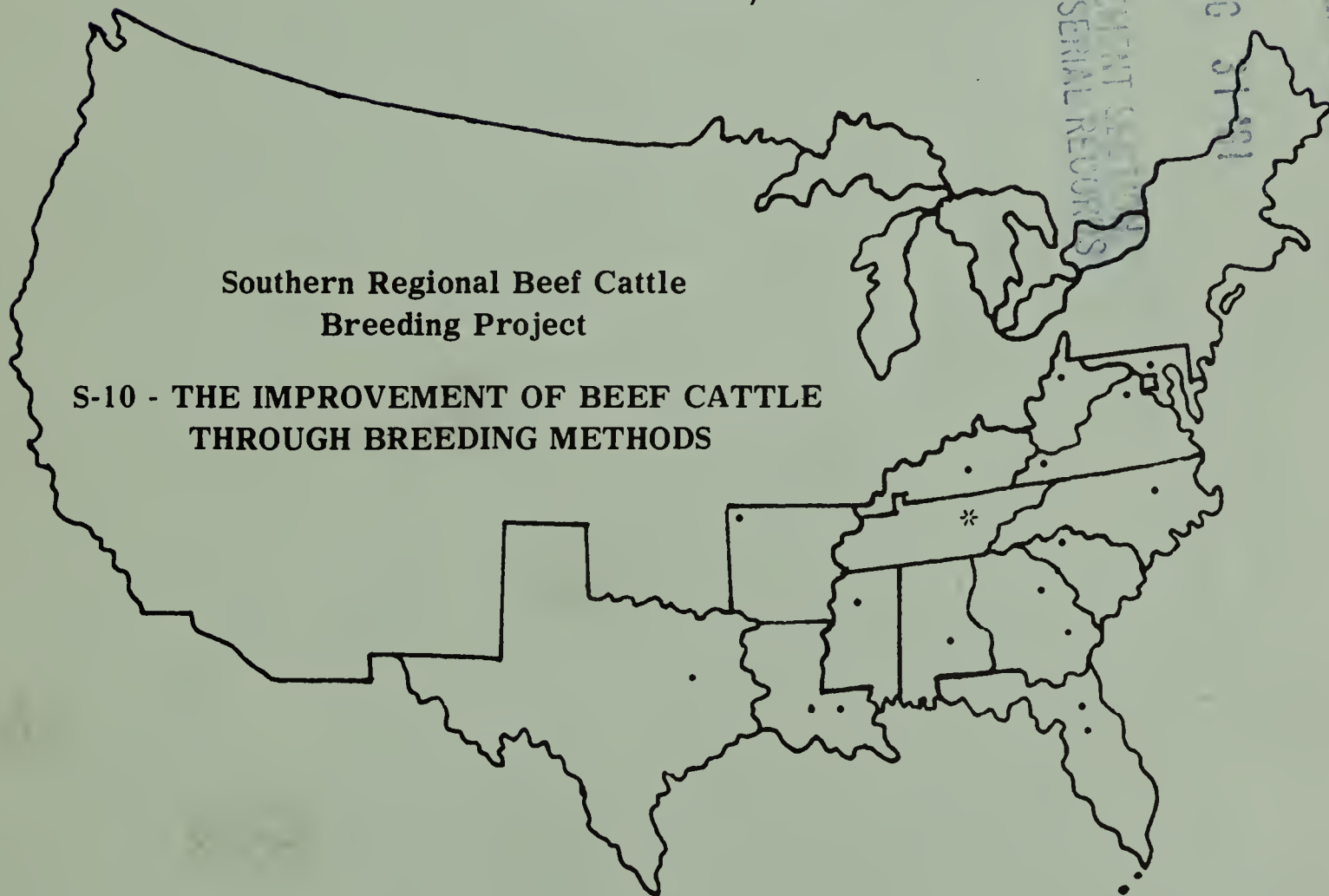
and

Report of Annual Technical Committee Meeting

Texas A & M University

College Station, Texas

June 26-29, 1966



PRODUCTION SECTION
CURRENT SERIAL RECORDS

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and is not for general publication.

S-10 - 1965 ANNUAL REPORT

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INTRODUCTION

This project was initiated in 1948 to investigate and develop methods of breeding more productive beef cattle for the South. Detailed annual reports showing research developments and progress in each state have been prepared each year since 1950. Complete results of certain phases of the project have been reported in regional bulletins and technical articles and bulletins published by workers in the various states which contribute to the S-10 project.

This publication includes the proceedings of the 1966 annual meeting of the S-10 Technical Committee and the annual reports of projects in each of the 12 contributing states. The annual reports of S-10 contributing and supporting projects were prepared by the project leaders and other personnel at the various stations as summaries of the research developments and progress at each station during 1965. The results are not considered final, but the materials aid cooperators in developing an integrated program. This report also provides information needed by heads of animal husbandry departments, experiment station directors, and U. S. Department of Agriculture officials for evaluation of the projects with respect to objectives and procedures. This report is not for general distribution, and material contained in it should not be quoted in publications.

PROGRAM
S-10 TECHNICAL COMMITTEE MEETING
Texas A&M University
June 26-29, 1966

Sunday, June 26

7:00 p.m. Assemble at Holiday Inn, Temple, Texas
Executive Committee meeting

Monday, June 27

8:00 a.m. Assemble at Livestock and Forage Research Center, McGregor, Texas
Welcome to Texas - O. D. Butler and H. O. Hill
8:30 a.m. Texas station report and tour of experiment station - T. C. Cartwright, W. E. Kruse and A. A. Melton
11:15 a.m. Leave for College Station, Texas - Lunch in Temple, Texas, enroute to the Memorial Student Center, Texas A&M Univ., College Station
Assemble in Room 3B and 3C of the M.S.C.
3:00 p.m. Welcome to Texas A&M - Dean R. E. Patterson
3:30 p.m. Initial Committee Reports
Data Collection and Analysis - W. C. Godley
Standardization of Carcass - C. E. Lindley
Annual Report Forms - J. A. Gaines

Tuesday, June 28

8:00 a.m. Assemble in Room 115, Animal Industries Building
Basic Beef Cattle Genetics Laboratory - T. C. Cartwright
8:20 a.m. Beef cattle immunogenetics and related research - D. F. Weseli
8:50 a.m. Beef cattle cytogenetics and related research - N. M. Kieffer
9:20 a.m. Cattle, sheep, and swine cytogenetics research, Oak Ridge, Tenn. - A. L. McFee
9:50 a.m. Break Student Lounge
10:00 a.m. Tour of Basic Beef Cattle Genetics Laboratory facilities
10:30 a.m. Meats Chemistry Research at Texas A&M - W. A. Landmann
11:30 a.m. Tour of Meats Chemistry and Meats Laboratory facilities
12:00 noon Lunch at M.S.C.
Assemble in Room 3B and 3C of M.S.C.
1:00 p.m. Station reports
Mississippi - C. E. Lindley
North Carolina - E. U. Dillard
South Carolina - W. C. Godley
Tennessee - C. S. Hobbs
Virginia - J. A. Gaines
Virginia, Front Royal - B. M. Priode
4:00 p.m. Report on analysis of crossbreeding data from Steeles Tavern, Virginia - Gary Richardson
4:30 p.m. Tour of livestock facilities at Texas A&M
6:30 p.m. Dinner and evening get-together at the Ramada Inn. Guests of the Texas & Southwest Cattle Raisers Association.

Wednesday, June 29

Assemble in Room 3B and 3C of M.S.C.

8:00 a.m. Report from S-10 Investigations Leader

8:30 a.m. Report from S-10 Administrative Advisor

9:00 a.m. Report from Animal Husbandry Research Division - E. J. Warwick

9:20 a.m. Report from Cooperative State Research Service - M. J. Burris

9:40 a.m. Break

9:50 a.m. Final Committee Reports

Data Collection and Analysis - W. C. Godley

Standardization of Carcass - C. E. Lindley

10:15 a.m. Final Business Session

Resolution Committee Report

Selection of site for 1967 meeting

Old business

New business

Chairman's Report - C. J. Brown

S-10 Technical Committee Meeting
College Station, Texas
June 26-29, 1966

The 1966 meeting of the S-10 Technical Committee was held at Texas A & M University, College Station and the McGregor Livestock and Forage Research Station, McGregor, Texas.

Dr. C. J. Brown, Chairman, presided with Dr. T. C. Cartwright acting as host. Dr. O. D. Butler welcomed the group to Texas. Mr. H. O. Hill welcomed the group to McGregor and Dr. R. E. Patterson welcomed the group to Texas A & M.

Those attending the meeting were:

E. U. Dillard, North Carolina State University, Raleigh, North Carolina
T. M. DeRouen, Iberia Livestock Exp. Sta., Jeanerette, Louisiana
Doyle Chambers, L.S.U. Agr. Exp. Sta., Baton Rouge, Louisiana
T. B. Patterson, Auburn University, Auburn, Alabama
C. E. Lindley, Miss. State University, State College, Mississippi
George Robertson, L.S.U. An. Sci. Dept., Baton Rouge, Louisiana
W. Lamar Reynolds, Iberia Livestock Sta., Jeanerette, Louisiana
Larry V. Cundiff, Univ. of Kentucky, Lexington, Kentucky
Bill Turner, L.S.U. An. Sci. Dept. Baton Rouge, Louisiana
Bernard M. Jones, Jr., Univ. of Kentucky, Lexington, Kentucky
Neil W. Bardley, Univ. of Kentucky, Lexington, Kentucky
Gary Richardson, U.S.D.A. Biometrical Services, Beltsville, Maryland
Haley M. Jamison, Univ. of Tennessee, Knoxville, Tennessee
Robert D. Scarth, Univ. of Georgia, Athens, Georgia
Martin J. Burris, Cooperative States Research Service, USDA, Washington, D.C.
Gordon W. McLean, Livestock & Forage Res. Center, McGregor, Texas
M. J. Norris, Livestock & Forage Res. Center, McGregor, Texas
Derick R. Smith, Corrientes, Argentina
Walter Kruse, Livestock & Forage Res. Center, McGregor, Texas
T. M. Clyburn, Ga. Coastal Plain Exp. Sta., Reidsville, Georgia
James R. Hill, Jr., Clemson Univ., Edisto Exp. Sta., Blackville, S. Carolina
Donald F. Weseli, Texas A & M
Walter Neville, Ga. Exp. Sta., Experiment, Georgia
James Brinks, Coordinator, W-1, Fort Collins, Colorado
W. C. Burns, Brooksville Beef Cattle Res. Sta., Brooksville, Florida
Everett J. Warwick, U.S.D.A., Beltsville, Maryland
Victor, Galvez, Univ. of Sonora, Hermasillo, Sonora, Mexico
W. C. McCormick, Ga. Coastal Plain Exp. Sta., Tifton, Georgia
Marvin Koger, Univ. of Florida, Gainesville, Florida
Maurice Shelton, Livestock and Forage Res. Center, McGregor, Texas

Ed Huston, Livestock and Forage Res. Center, McGregor, Texas

O. D. Butler, Ani. Sci. Dept., Texas A & M

T. C. Cartwright, Animal Science Department, Texas A & M

H. O. Hill, Supt. Livestock and Forage Res. Center, McGregor, Texas

C. J. Brown, Ani. Sci. Dept., Univ. of Arkansas, Fayetteville, Arkansas

A. A. Melton, Texas Station

Executive Committee Meeting Minutes
June 26, 1966
8:00 p.m.
Temple, Texas

Chairman C. J. Brown presided.

Others present were Doyle Chambers, E. J. Warwick, T. C. Cartwright, Martin Burris, N. W. Bradley, and C. E. Lindley

Dr. Cartwright discussed the program for the meeting noting a few changes.

The committee officially approved for publication the paper on cow size prepared by Henry Fitzhugh.

Doyle Chambers, Administrative Advisor and E. J. Warwick, AHRD discussed the situation relative to the hiring of a new Investigations Leader. Search was still underway for the right man.

The meeting adjourned at 9:30 p.m.

Respectfully submitted

Charles E. Lindley

Committee Assignments for 1966-67

Data Collection and Analysis

W. C. McCormick, Chairman
T. C. Cartwright
N. W. Bradley
J. A. Gaines

Standardization of Carcass and Meats

E. W. Dillard, Chairman
T. B. Patterson
C. J. Brown
Marvin Koger

Annual Reports

C. S. Hobbs, Chairman
Bill Turner
W. C. Godley

Minutes of S-10 Technical Committee Meeting
College Station, Texas
June 26-29, 1966

The meeting was continued on the campus of Texas A & M on June 27, 28, and 29.

Dr. McCormick reported for the data collection and analysis committee. The committee indicated the desirability of making out a form for collection of reproductive data.

C. E. Lindley reported for the Standardization of Carcass and Meats Committee. It was suggested by the committee that after the meeting of the Association of American Meat Science at Cornell the committee study carefully the publication entitled "Procedures for Beef Carcass Evaluation" and make a report at next year's meeting. This publication is to be published by the Meat Science group after their meeting. It was also suggested that more use might be made of the specific gravity technique.

Dr. Gaines reported for the "Annual Report Forms" Committee. He suggested that no change be made until the new Investigations Leader is on the job.

Gary Richardson gave a very good report on the crossbreeding work at Steeles Tavern, Virginia.

The morning of June 28 was used for an excellent program on the work at Texas in the Basic Genetics Laboratory by Dr. Cartwright, Dr. Weseli, and Dr. Kieffer. Dr. A. L. McFee from the Oak Ridge Atomic Energy Laboratory gave a very good report on cattle, sheep, and swine cytogenetics research in that laboratory. This was followed by a tour of facilities and laboratories at Texas.

State reports and a tour of livestock facilities at College Station were presented as scheduled on the afternoon of June 28.

The S-10 Technical Committee was graciously entertained at a dinner and social meeting by the Texas and Southwest Cattle Raisers Association at the Ramada Inn at College Station. Harry Gayden, Secretary of the American Brahman Breeders Association, presented an excellent talk. A copy of his talk is attached.

The committee assembled at 8:00 a.m. in rooms 3B and 3C of the Memorial Student Center.

Dr. Chambers gave the report as Administrative Advisor. A copy of his report is attached.

Dr. E. J. Warwick reported for AHRD. His remarks are attached.

Dr. Burris reported from CSRS.

The S-10 Technical Committee was declared in official business session at 9:45 a.m. on Wednesday, June 29, with Dr. Brown presiding.

Patterson moved approval of 1965 minutes with correction to show acceptance of 1967 meeting at Tennessee. Dillard seconded. Motion carried.

McCormick moved, Cartwright seconded approval of Executive Committee minutes. Passed.

Gaines moved, Dillard seconded approval of all committee reports. Passed.

J. A. Gaines was properly elected the new executive committee member for 1966-67 to serve with C. E. Lindley, Chairman, and N. W. Bradley, Secretary.

The resolutions committee report was made by Dillard. Acceptance moved by Dillard, seconded by Koger and carried. A copy is attached.

Haley Jamison asked for program suggestions for the Tennessee meeting in 1967.

Koger extended an invitation from Florida for the committee meetings. No action was taken. The possibility of joint meetings with other regions were discussed. No action was taken.

A discussion of further analysis of the data used by Dr. Fitzhugh followed. While no action was taken it was understood that committee approval for use of the data was given with any station having the right to withdraw any of its data. Publications of any further papers would be handled as the Fitzhugh study.

Jim Brinks, Investigations Leader from the Western Region, was recognized and asked for any comments.

Chairman Brown expressed appreciation for cooperation of the group during the year and to the Texas group for their hospitality.

There being no further business the meeting was adjourned at 11:30 a.m.

Respectfully,

C. E. Lindley
Secretary

Report of the Resolutions Committee

Be It Resolved

1. That the S-10 Technical Committee express its most sincere thanks to Dr. T. C. Cartwright and Dr. Don Weseli for arranging and conducting an outstanding pre meeting tour that was both educational and enjoyable.

2. That the committee express its appreciation to those persons and organizations that were hosts during the tour; namely, Mr. John Cypher and the King Ranch, Mr. R. P. Marshall and the Santa Gertrudis Breeders International, Mr. Lawrence Wood, Mr. Claude McCan, Mr. James Forgason, Mr. Andrew Askew, Mr. B. C. Dunn, Mr. Mat Syler and Dr. Gardner, Mrs. Andy Williams, Mr. Sterling Evans, Dr. R. O. Berry and the Wortham Foundation.

Be It Resolved that the S-10 Technical Committee express its appreciation to Mr. H. O. Hill and his staff for their presentation of the beef cattle research work at the Livestock and Forage Research Center at McGregor.

Be It Further Resolved that this committee express its sincere thanks to Dr. O. D. Butler and his staff at Texas A & M University for their many contributions to the success of the 1966 annual meeting.

Be It Further Resolved that this committee extend its special thanks to Dr. A. L. McFee for his interesting and informative discussion on cytogenic research at the U. T. AEC Laboratory.

Be It Further Resolved that the members of the committee extend to Mr. Dick Wilson and the Texas and Southwestern Cattle Raisers Association appreciation for their hospitality during the meeting.

Be It Further Resolved that the technical committee express its sincere appreciation to Mr. Harry Gayden for a thought provoking appraisal of the role of the breed association in beef cattle improvement.

Be It Further Resolved that the members of this committee recognize the absence of Dr. R. S. Temple and express their appreciation to him for his leadership, sincerity and congeniality (cajun stories) as Investigation Leader during the past four years. This committee wishes Bob and his family a pleasant and successful sojourn in Italy.

We recommend that a copy of these resolutions as appropriate be sent to each of those mentioned in the resolution and to Dr. R. E. Patterson, Director, Texas Agricultural Experiment Station, College Station, Texas, and Dr. E. J. Warwick, Chief, Beef Cattle Research Branch, USDA, Beltsville, Maryland.

Respectfully submitted,
E. U. Dillard, Chairman
W. C. McCormick
N. W. Bradley

Remarks of Doyle Chambers, Administrative Advisor,
to
S-10 Committee
June, 1966

During the past year the S-10 project and those of you contributing to it received a significant vote of confidence when the Southern Directors and the Committee of Nine recommended its revision to the Secretary of Agriculture for funding as a Regional Project. Its approval by CSRS for the Secretary has now been given and it is up to those of us who are associated with the project to make the most of this opportunity to provide the kind of information which will permit the states of this region to develop a more productive beef cattle industry.

Although funded to an appreciable extent by earmarked funds designated as the Regional Fund, it should be pointed out that this fund is administered in the Southern Region by the Station Director who also administers other Federal funds under the Hatch, McIntyre-Stennis, and Facilities Acts as well as State appropriated funds. This would be well for each of us to keep in mind - each station director has a right to expect from this research that information which will strengthen the beef cattle industry of his own state.

We who have been closely associated with the beef cattle breeding research programs for sometime have rather assumed that, with the varying environments found in the varying regions where beef cattle are grown, genetic-environmental interactions would be important. The time is fast approaching when we need to take a scientific look at these not only for benefit of the industry, but to determine whether or not genetic studies with beef cattle need to be conducted under the different environments.

I would likewise encourage you to work closely at each of your stations with others whose inputs will be essential for a successful beef cattle enterprise - your agronomists, your agricultural economists and engineers, your parasite and disease control researchers, your nutritionists, physiologists, and meats scientists. Beef cattle breeding will be essential to industry success but is not sufficient unto itself.

I should report that your chairman and I had a good meeting with ARS and CSRS personnel at Beltsville regarding this project and tried to speak for you and your directors. We appreciate your communicating promptly and clearly to us. It was a good conference and I think it should further strengthen the total research program on beef cattle breeding.

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Speech to S-10 Conference
By Harry Gayden, Secretary American Brahman Breeders Assn.
June 28, 1966

I consider it a privilege to appear before you tonight to discuss matters or problems which are of mutual interest.

At the outset, I wish to say that we of the American Brahman Breeders Association have a healthy respect for research, and therefore, appreciate the opportunity to briefly review certain areas in which we need closer cooperation.

It is a coincidence that the first day I worked for ABBA, just 18 years ago, I came here to Texas A & M, accompanied by the president of the Association, to discuss ways and means whereby the ABBA could cooperate in providing animals needed for two research projects soon to get under way. One was the performance and crossbreeding work at the McGregor Station and the other a Jersey-Brahman crossbreeding project in the dairy department here on campus.

When I first received the invitation from Dr. Tom Cartwright to appear before you, I momentarily felt like declining because I did not and still do not feel competent to address a group of leaders in the field of animal research. However, after talking further with Dr. Cartwright, as well as with Dr. R. S. Temple, I gained the impression that perhaps I may have some thoughts of interest to you, primarily because of my position with one of the smaller and probably not so well known beef breed associations. I was told by both that there was no specific precedent for speakers before this group, as you have had discussions on strictly scientific subjects ranging to outright humor. The one thing both Dr. Cartwright and Dr. Temple told me was that this was a group you could talk to in a straightforward manner -- as they said, "Let your hair down."

I, therefore, propose to do just this in certain areas of my discussion. At the outset, I feel there are preliminary remarks that should be made to acquaint you in a general way with the Brahman breed, its history, development, present status and outlook for the future.

We are completely sold on the Brahman as a breed of growing importance and great possibilities. However, we are also firmly aware that Brahman cattle have their limitations and I propose to briefly discuss those of most importance. If I may borrow the phrase of someone of long ago, "We feel that there is no beef breed that is best under all conditions but each of them excel under certain conditions."

The Brahman (or American Brahman as we often call it) is a breed within the *Bos indicus* (Zebu) species which was developed in the Gulf Coast region of the United States through the amalgamation of several Indian types. Approximately 266 bulls and 22 females were imported into the United States from India and Brazil between 1854 and 1926. The females were owned by two ranches which did not sell purebred females. Therefore, the majority of our present day Brahman are the result of an upgrading program using imported bulls on cows of the several British beef breeds coupled with strict selection for beef qualities.

The American Brahman Breeders Association was organized in 1924, with registrations beginning in 1926. Our annual registrations are approximately 15,000 head at present. A total of 376,000 animals have been registered to date.

The Herd Book is still open to permit the recordation of worthy female animals resulting from five top crosses of pedigreed Brahman bulls. However, very few such females are now being recorded in the U. S. -- perhaps not more than 4 or 5 annually.

We feel that considerable progress in genetic improvement of the breed has been made in the some 40 years since organization of the Association. This is quite evident when we compare the Brahman of today with early imported Zebus, or even present day cattle of India, Pakistan or Brazil. However, we are quick to admit that the Brahman breed has not reached the degree of improvement achieved by the British breeds, some of which were first brought to this country 150 years ago.

It might be well here to put the Brahman breed into proper genetic perspective with other American beef breeds. It is interesting to note that every other beef breed of American origin was developed through a Brahman cross. This proves rather conclusively that the Brahman has certain desirable traits that are lacking in European types or that express themselves to a limited degree.

These Brahman x European breed crosses, in their initial stages, put genes for both desirable and undesirable traits in the resulting breeds into a heterozygous state. The Brahman, by contrast, in the result of amalgamation of several similar types within the same genetic species, and therefore, tends to be more homozygous for certain traits.

This is an important consideration affecting the rate of genetic improvement within each of these breeds and is also important, especially in the case of bulls, in crossbreeding programs.

Without immediately putting you on the defensive by expounding on the attributes of the Brahman, I would like to briefly touch on what we consider to be the breed's most important desired traits.

1. Environmental Adaptation - The Brahman breed is basically known for its environmental adaptation -- tolerance to heat and high humidity, resistance to insects and certain diseases transmitted by flying vectors and a marked

ability to survive and sometimes thrive under adverse climatic and nutritional conditions. This is, of course, important only to producers in the southern part of the U. S. and in tropical and subtropical regions of the world.

This factor, however, takes on added significance when we realize that future expansion of beef production to feed a rapidly increasing world population will necessarily shift to Latin America, Africa, Australia and perhaps other tropical areas.

2. Mothering Ability -- Brahman cows are excellent mothers and give ample milk to raise heavy calves.

3. Longevity -- The productive life of Brahmans and Brahman hybrids is, in general, significantly longer than cattle of the European breeds.

4. Carcass Quality -- The Brahman tends to produce a high cutting carcass free of excess fat.

With some of the desirable traits mentioned, it is equally important and probably more appropriate to discuss with this group the more significant weaknesses of the breed. We believe that research will play a leading role in assisting breeders to eliminate or overcome some of these undesirable characteristics.

I propose to discuss these traits in the order of their importance.

1. Disposition -- In my estimation, the disposition and activity of Brahmans is the most important factor limiting their acceptance. By the same token, their intelligent, energetic nature accounts largely for their unusual thriftiness, hardiness and adaptability to difficult conditions of climate and feed. Brahman breeders recognize the importance of disposition and are making good progress in this area.

2. Reproductive Performance -- This ranks with disposition in importance. Because of this and the fact that it lends itself more readily to research, our "Research Committee" has designated reproductive performance as the Association's primary area of attention and proposes to sponsor and support research first in this field. Of particular concern is low calving percentage

and calf mortality soon after birth.

3. Rate of Gain and Feed Efficiency -- We are aware that rate of gain and feed efficiency in Brahman cattle need improving. There are individual animals within the breed that have creditable rates of gain and feed efficiencies, but we need more research and selection toward improving this trait.

4. Conformation -- There is always room for improvement in conformation. We recognize that there are certain inherent differences between the typical conformation of the Brahman and that of the European breeds. We are not attempting to make the breed over into the blocky, square, deep, low set type which prevailed among some breeds for a number of years. We are trying to emulate some of the desirable characteristics of a good beef animal and produce a middle of the road type -- moderate in length of body and leg, moderate depth in proportion to length, longer, wider, more level rump (although not straight), roomier middle, strong boned and heavily muscled.

5. Tenderness -- Research shows that Brahman meat tends to be somewhat less tender than that of other breeds. In research at one station, highest and lowest tenderness scores were recorded for meat from Brahman blooded animals. This would indicate that there is considerable variation in this trait, and therefore, ample opportunity for selection. We anticipate further research in this area.

This might be a good point to digress for a moment and discuss what we consider to be the principal responsibilities of a breed association and how we may or may not be meeting these responsibilities.

I think we will all agree that the basic function of a breed association is keeping and administering accurate records of ownership and genealogy on eligible pedigreed animals. In this, the associations have done an excellent job and we can point with pride to records systems ranging from completely functional manual programs used by the smaller breed associations such as ourselves -- to the sophisticated computer programs used by the larger associations.

Just as important, we feel, is the association's responsibility to its own breed and to the industry -- to provide sound leadership built on progressive thinking and a realistic approach to change.

This responsibility is shared equally by the association's breeders and executive management.

I'm afraid we, as breed associations, have, in many respects, fallen far short in this very important area of responsibility. We have all been guilty of: for example -- evaluating a new approach -- a modern innovation or a different concept in terms of "how will this affect my breed" rather than "will this be for the long range good of my breed" even if it involves adjustments in policy or breeding goals; -- of bowing to the pressures of shortsighted breeders who can see no farther than their pocketbooks -- in making important decisions affecting breed progress; -- of a lack of cooperation with and sometimes animosity toward other breed associations; -- of advertising claims that don't lie but certainly stretch the truth. The voice of the breed association is relatively ineffective outside of its own membership at present for these and other reasons.

Breed associations generally mold the future of their breed and greatly influence the direction of the industry. They should merit this position of leadership by defining the path and implementing the tools of greatest long range breed progress. But too often they follow the lead of their more progressive breeders and even commercial cattlemen.

Today, the sound and progressive leadership in the industry is being supplied largely by the research community -- while the breed associations shift for position among themselves.

I'd like to think I'm a practical man as much as an idealist and fully realize we will never reach utopia in most of these areas -- but some improvements could certainly be made for the good of each breed and the industry. A starting point would be much closer cooperation among breed associations

and with you in research.

At this point I would like to outline to you the approach that Brahman breeders and the Association have taken to overcome some of the breed's weaknesses.

In ABBA's long range planning program, committees are appointed to study various segments of the Brahman industry and Association activities. One of the most active of the standing committees is the one on "Research." This committee recommended to the Board of Directors in 1964 that a research fund be established and that the directorate promote and actively support, by financial assistance, worthy research projects involving Brahman cattle.

Subsequently, such a fund was created, amounting to nearly 10% of the Association's annual income. The research committee has begun to function in the fund's administration for research purposes.

One of the most interesting and productive meetings that has been held by this committee was an occasion when representatives of the animal science departments of three leading universities in Brahman research were present and discussed their respective research programs. Our board of directors was impressed and highly pleased with the session. More meetings of this kind are sure to bring about better relations and closer cooperation between research and cattle breeders.

Another activity started by the Research Committee was the cataloging of all research projects in the U. S. involving Brhaman cattle.

One phase of the program called for the ABBA office to obtain annual progress reports from project leaders. These reports were to be made available to our membership directly and were to be published in a breed magazine, but only with the permission of each project leader. This procedure was cleared with the S-10 Investigations Leader, and project leaders were contacted by letter explaining the program and were asked to submit annual progress reports.

I am sorry to announce that after two year's effort we had to drop the program because we were not successful in obtaining progress reports. We feel the fact that many research men are loaded down and also that there is a reluctance to release information on a project prior to its conclusion were contributing factors, but this is somewhat difficult to explain to some of our board members. If you consider this criticism, we hope you will take it constructively -- as it is not directed at any person or group. However, it is an area in which we need more communication.

I am sure that those of you in research could mention many areas in which breed associations and cattlemen could make your work more interesting and rewarding by closer cooperation.

In the Brahman industry, there is another area in which we occasionally wonder if there is a need for research and, if so, what direction it should take. This is the export market. Canada and Mexico are traditionally the best U. S. Markets for beef cattle. Likewise, the U. S. is their best customer. The European beef breeds dominate the picture in trade with these two countries. However, if we disregard Canada and Mexico, then the export picture changes considerably.

Brahmans represent only about 1-1/4% of the total number of beef cattle registered annually in the U. S. However, the U.S.D.A. Foreign Agricultural Service reports reflect that Brahmans represent 75% to 80% of all beef breeding cattle exported from the United States (disregarding Canada and Mexico).

For the past 10 years approximately one third of total sales of Brahmans have been for export.

In many areas of Latin America, because of conditions of range, cattlemen prefer beef animals larger in size with more length of leg than our domestic market will tolerate. Furthermore, because of management practices and consumer demands -- quality, thickness, early maturity and certain other characteristics preferred in this country are of secondary importance there.

We wonder, therefore, if research could assist us in better serving the demands of our foreign customers, while meeting our domestic requirements.

Now that we have discussed the past and present of the Brahman breed, it seems appropriate to comment on its future. Surely the future of no breed is guaranteed. In the lifetime of many of you here tonight there has been a marked change in the status of several beef breeds and other classes of farm animals in the United States.

Brahman breeders and the Association feel that the breed has a well defined and very essential role in future beef production in this country -- a position that cannot be occupied by any other existing beef breed. I refer, of course, to crossbreeding for hybrid beef production. But this position is not guaranteed! We must continue to improve the breed and keep pace with progress in beef production to continue to merit a place in the industry.

I could dwell at length on crossbreeding -- it's advantages and disadvantages; it's potential for increasing production; and why we feel that Brahman is essential to successful hybrid beef programs. However, many of you are more familiar with the points I would mention than I am because research in recent years has dealt with them time and again.

Perhaps no beef breed in recent years has benefited more from research than has the Brahman. Unquestionably, the results of 15 years of research on crossbreeding by several leading universities in the southern United States have been a major contributing factor to the present status of the Brahman breed in this country.

One of the real disappointments in this connection is the slow acceptance of research results by cattlemen and breed associations. I do not refer specifically to acceptance of crossbreeding, but to acceptance of research findings in general. An unwillingness to accept performance testing and its several facets is of particular concern to us.

I mentioned earlier that one of my first activities with ABBA was participation in a conference with research officials here at Texas A & M regarding a crossbreeding and performance testing program at the McGregor Center. We were perhaps the first breed association to encourage participation in and solicit animals for rate of gain tests. In fact, ABBA was the first breed association to become affiliated with the American Beef Cattle Performance Registry Association. Our breeders have been generous in their gifts and loans of animals to universities and experiment stations for research purposes. Yet, we do not have a record of performance program and very few of our breeders are maintaining performance records in a scientific manner.

This situation is a source of disappointment to me. The subject has been brought to the attention of our board of directors on a number of occasions, but they do not seem ready to accept it.

Perhaps some are reluctant to get into the program because in early feeding trials, purebred Brahmans did not make impressive gains. Others reason that they are already burdened with record keeping and do not wish to become involved in additional details. Some of our more progressive breeders have been fortunate in selling surplus breeding animals at early ages and are therefore reluctant to put animals on rate and efficiency of gain tests.

As a breed association, we have failed to put into practice one of the most revolutionary tools of the past century for evaluating the performance potential of beef cattle. How to gain acceptance of research findings is, therefore, as much a problem to breed associations as financing and obtaining fast research results are to animal scientists.

Substantial adjustments have occurred in recent years on the ideal beef carcass and what type of steer produces such a carcass. The emphasis is on muscling. More accurate methods of determining the value of a beef carcass have been developed such as cutability -- now being used to reflect substantial differences in the value of carcasses that fall into the same weight and grade.

Research has shown that the longer bodied, longer rumped steer without excessive depth of body and standing on a little more leg tends to produce a higher cutting, efficient carcass, that is relatively free of waste fat. The Brahman hybrid has traditionally produced such a carcass and has been severely penalized for it, both on the hoof and on the rail, over the years. But times are changing. The factors upon which Brahman hybrids were downgraded in years past are the very factors which are today producing higher cutting, more valuable carcasses.

So the industry is changing, and very rapidly. No one breed or group has a monopoly on beef production. Concepts are being reshaped. Research is discounting long held theories and ideas. The industry is changing and we must change with it.

The press of inflation, government controls, labor, increased competition for land, and substitute foods is being felt by all of us. Nothing but benefit can come from the presentation of a united industry effort built upon a much closer working relationship between the breeds and with the scientific community.

Remarks to S-10 Committee

E. J. Warwick
U. S. Department of Agriculture
June 29, 1966

The basic pattern of cooperation in the three regional beef cattle breeding projects has remained essentially the same since they were started in the late 1940's. They have involved both State Agricultural Experiment Station and U. S. Department of Agriculture participation. The Department's contributions have included (1) putting the work of the Federally-owned stations into the project, (2) making relatively small amounts of money available for use by State Agricultural Experiment Stations under cooperative agreement, or Memorandum of Understanding, and (3) employing a person to serve as Coordinator, or Investigations Leader, for each project. This past spring, two of the Investigations Leader positions became vacant, and it seemed an opportune time to examine in some depth the pattern of cooperation and, particularly, to get the opinions of all involved on whether the Investigations Leader positions were as necessary now as they had been in the past. In order to accomplish this, our Division contacted each Administrative Advisor and Technical Committee Chairman in March, 1966, requested that they get opinions from members of their respective groups, and then come together in a meeting at which the various questions could be discussed. This was done and we greatly appreciated the fact that we were able to hold a meeting in Beltsville in April at which all three of the Technical Committee Chairmen, two of the Administrative Advisors, the three Investigations Leaders, and various Cooperative State Research Service and Agricultural Research Service administrators were present. The meeting was for discussion purposes only and was not empowered to take any definitive actions, however, during the course of discussion, it became apparent that there was a strong unanimity of opinion to the effect that the Investigations Leader positions were as

important to the success of the Regional Beef Cattle Breeding Projects as they had ever been. The thought was expressed that there was likelihood of their becoming even more important as projects developed and there was need for more pooling and analysis of data from several locations on specific problems.

As a result of these discussions, we are proceeding to fill the two vacant positions as rapidly as possible. We feel, and I am sure you will all agree, that filling the positions with the right men is much more important than merely filling them promptly. Obviously, the availability of competent experienced personnel interested in one of these jobs at current Federal salary levels, is rather limited. Thus, it would not be unexpected if it were some little time before we are able to fill the S-10 position. While this position is vacant, we are also considering alternative locations. No decision has been made on whether the office will remain at Knoxville or whether it might be shifted to some other location in the region. We will keep you informed on the progress of attempts to fill this position and, as has always been true in the past, we will not hire a person unless he has the approval of at least a majority of the persons with whom he will be working.

Turning now to the S-10 project, itself, there are a few comments I would like to make. First of all this project has been productive during the eighteen years since its organization, and I feel there is every reason to believe the productivity will continue. Some questions seem to me to be pertinent at this time.

One of these is the place of efficiency studies. There are those in the nutritional field who say that we can predict the efficiency of gain and maintenance by cattle of different sizes on the basis of what has been learned from dairy cattle by past research. This is perhaps true, but it also seems to be true that we will need to run at least some limited experimental work

to ascertain whether the relationships previously determined for cattle of other types apply to beef cattle. It is for this reason that I am glad to see some developments of the kind we saw on Monday at McGregor. Perhaps it will be found that the generalized relationships developed heretofore with other types of cattle, do apply to beef cattle. If so, we will be able to get by with a relatively small amount of experimental work specifically on this subject. On the other hand, if they do not apply, it opens up an entirely new field which will have to be explored.

A question always in the forefront in projects such as S-10 pertains to how the smaller herds can make their greatest contribution. In the early days of the project, these herds contributed significantly to information on the basic parameters of beef cattle, including variability, effects of age of dam on weaning weight, effects of sex on performance, etc. Generally speaking, I believe we must admit that the use of these smaller herds in long-term things, such as selection experiments, has not been very successful. This is probably basically due to two things, namely the short life of many projects and the fact that some of these herds have never been in projects designed to answer specific questions.

It is my idea that these herds are likely to be most productive if they are used to answer basic questions on methodology, physiological aspects of genetic differences, etc. Competing uses for these herds must always be taken into account in designing projects. It seems to me that, when we look at these smaller herds (much of this will also, of course, apply to larger herds), it is absolutely essential that the researcher compute the probable time required to obtain significant results and estimate the probability that personnel, administrative procedures, and other aspects of project operation will remain on a stable enough basis for a long enough time to give a reasonable probability of completion and attainment of project objectives. A fact, which goes hand-in-hand with the above, is that it is

absolutely essential that every project be designed to answer one or more specific questions. At our present stage of development they are extremely unlikely to be productive if this is not the case.

Two things disturb me somewhat in regard to regional beef cattle breeding research. The first of these is that there seems to be a distinct tendency for "fashions" in types of research. One current illustration of this may be interest in crossbreeding studies. As you know, three or four major projects in the country have shown quite promising results for the systematic use of crossbreeding among the British breeds as well as in crosses with the Brahman or Charolais. As a result of these experiments, there seems to be a tendency toward a proliferation of crossbreeding experiments. Does every state need a crossbreeding experiment or is information from a few well-designed studies generally applicable? If it isn't, why isn't it?

A second but related item Technical Committees must come to grips with is the matter of arriving at joint committee decisions on what types of studies are needed and then looking for locations which can carry on studies of these types. This procedure is, of course, the whole theory behind the development of regional projects. I personally doubt very much if regional projects will be fully successful, or attain long-lasting administrative support, if they merely serve as clearing houses for technical workers in the field to get together and compare results. They must be effective planning units.

Probably, we need to look critically at the entire beef picture and put the most important problems in priority order. The priority order may, of course, well differ from region to region.

In this relation, I believe it is pertinent to point out (although all of you are undoubtedly familiar with the situation) that budgets for agricultural research are increasingly coming under critical scrutiny by high level administrators. To a greater degree than has been true in the past, we are being asked to justify each request. In the Federal Government, this

approach has taken the so-called PPB form, i.e., Programming, Planning and Budgeting. In essence, this system is merely an organized method of developing budgets in such a way that planned expenditures can be compared with projected or planned benefits and a cost-benefit ratio determined. None of us can quarrel with this basic philosophy. As long as we are spending taxpayer's money, it is only right that he know something about what we expect to get for the expenditure of his money. On the other hand, I think we also all realize the difficulty of making predictions on what we can accomplish in research. Critical analysis of plans using this technique may well, however, in many cases steer us away from research where the returns are likely to be low in relation to the expenditure of funds.

During the course of this meeting, there has been some concern expressed about the slowness of adoption of results from research of this project and other regional projects in the nation. I am not necessarily discouraged on this because I feel the research has had a real impact. Last year there were well over a half-million cattle in the United States on performance testing programs and we have to look back only ten years or so to realize that it would have been a rare person who would have predicted this degree of development by 1965. However, it is also true that application of breeding research results has been much slower than would have been desirable. This has been particularly true in the so-called "top" or "elite" herds within the various breeds. In all too many cases procedures are being followed even though research has shown them to be unsound.

The question is, "What measures should researchers take to improve or increase the rate of adoption of their research?" First of all, I think we have to realize that the beef production process is a chain, with the final link being the consumer and extending back through the retailer, the packer, the commercial producer, the "multiplier" seedstock herds, and the "top or elite" seedstock herds from which the multiplier units traditionally have

obtained their sires. It is illogical to expect persons occupying any one of the links in this chain, to change their production or breeding practices unless there is an effective demand from the next link in the chain which will make this financially remunerative. Thus, it seems to me that as researchers we have a responsibility for making information available to persons occupying all links in the production chain, probably with more emphasis than in the past on consumers and the operators of commercial herds who are in a position to make their demands felt on other segments.

Recently I had a letter from a person I consider to be a real thinker in the purebred beef industry, in which he suggested that the U. S. Department of Agriculture should be more active in establishing performance standards to be used in shows and also that the Department should establish and promote a national show for beef cattle in which recognition would be based solely upon performance and carcass characteristics. I do not know how either of these objectives could be accomplished, but certainly there is something to think about. Further, I believe we need to recognize that each of us is in a position to exert some degree of influence on livestock shows and that perhaps we should be more active in this regard.

Another thing which has been suggested from time to time, is that it would be desirable to have a national test for beef cattle performance -- something on the order of random sample tests which have been used for egg production in the poultry industry. Is such a thing desirable? Is it logistically feasible? If so, what organization or type of organization should sponsor it?

As always, it has been good to attend the S-10 meeting and I appreciate the opportunity to talk with you briefly about some of the things which are on my mind.

ANNUAL REPORT OF COOPERATIVE REGIONAL PROJECTS
January 1 to December 31, 1966

1. PROJECT: S-10, Improvement of Beef Cattle through Breeding Methods

2. COOPERATING AGENCIES AND PRINCIPAL LEADERS:

Cooperating State Experiment Stations and Technical Committee:

Alabama	T. B. Patterson
Arkansas	C. J. Brown
Florida	Marvin Koger
Georgia	W. C. McCormick
Kentucky	N. W. Bradley
Louisiana	J. W. Turner
Mississippi	C. E. Lindley
North Carolina	E. U. Dillard
South Carolina	W. C. Godley
Tennessee	C. S. Hobbs
Texas	T. C. Cartwright
Virginia	J. A. Gaines

U. S. Department of Agriculture Agencies and Leaders:

- E. J. Warwick, Beef Cattle Research Branch, AHRD, ARS, Beltsville, Maryland
- R. S. Temple (resigned), Investigations Leader, S-10, AHRD, Knoxville, Tennessee
- W. C. Burns, Superintendent, West Central Florida Experiment Station, Brooksville, Florida
- D. C. Meyerhoeffer, Superintendent, Iberia Livestock Experiment Station, Jeanerette, Louisiana
- B. M. Priode, Superintendent, Beef Cattle Research Station, Front Royal, Virginia
- M. J. Burris, Animal Geneticist, Cooperative State Research Service, Washington, D. C.

Regional Officers, 1965-66:

- Doyle Chambers, Administrative Advisor, Baton Rouge, Louisiana
- C. J. Brown, Chairman, Fayetteville, Arkansas
- C. E. Lindley, Secretary, State College, Mississippi
- N. W. Bradley, Executive Committee Member, Lexington, Kentucky

3. PROGRESS OF THE WORK AND PRINCIPAL ACCOMPLISHMENTS:

A regional publication dealing with reproduction of beef cattle in the South was completed and is in the hands of the printers. This study indicated that breed, location, age and lactation status were important factors in determining reproductive efficiency. A number of significant interactions among these factors suggest complexity of this problem.

A regional study on the relationship of cow size to productivity is in progress. One journal paper has been submitted and others are being prepared. Significant effects on cow weight were location-year, breed, sires, age of dam, previous parity, and progeny within sire. These data indicated an increase in weight up to nine years. Heritability of cow weight at calving was 0.96 and at weaning was 0.74.

Studies in nine states permit evaluation of systematic breeding procedures. At Virginia and Tennessee studies are concerned with development and at Mississippi the evaluation of inbred lines. In Louisiana, Georgia, Florida, Alabama, Virginia, and Texas crossbreeding studies permit comparisons of straight breeding, grading up, criss-crossing and rotational

crossbreeding. These studies also permit estimation of the importance of heterosis in determining production traits. The breeds of cattle involved include Hereford, Angus, Shorthorn, Brahman, Charolais, Santa Gertrudis, Brangus, Africander, Holstein, Brown Swiss and Red Poll. Comparisons of breeding systems are long-term studies and only preliminary results are presently available. Faster preweaning gains have been obtained from rotational crossbreeding or three-breed crosses. These studies indicate considerable heterosis in reproductive traits, and preweaning growth with less apparent heterosis in postweaning development and carcass traits. Evidence of differences in reciprocal crosses, compensatory gain when calves are free of maternal influence of the crossbred cow, differences in the degree of heterosis in different traits and the variety of cattle available for crossing indicates the need for more information about specific crosses.

Ten states have studies that permit estimation of genetic and environmental parameters. Environmental effects on traits of production have been evaluated as appropriate data were obtained. Several such reports were made this year. They permit a more definite description of circumstances and a more accurate basis to assess genetic differences. Analyses to estimate genetic parameters were completed for maternal ability at North Carolina and for cow weight, grade and condition at Virginia. Heritability estimates for cow weight were between .22 and .56, between .10 and .67 for grade, and .31 for condition. The genetic correlation between weight and grade ranged from .33 to .60.

North Carolina, Florida and Alabama have studies dealing with genetic environmental interactions. Analyses of these data are at present either incomplete or in the nature of preliminary reports. No major genetic-environmental interactions are apparent and preliminary information indicates that sire x location interactions are small.

Nine states have studies directly concerned with the development and/or evaluation of selection criteria and procedures.

Several criteria for evaluating reproductive performance are being explored. Work reported by South Carolina indicates negative results for a series of serological tests and sampling procedures for infertility in cows. At Front Royal conception rates of inbreds compared favorably with non-inbreds except for lightweight heifers bred to calve at two years. In a study of 12-years data at Arkansas there was higher death losses in males than females (4.2 vs. 2.6 percent) and higher death losses in Hereford than Angus (5.9 vs. 2.2 percent). The greatest difference between the breeds occurred at first parturitions.

Additional information on the relationship of preweaning gain and postweaning growth continues to indicate a fairly high correlation of growth in different periods. An analysis of factors affecting Hereford calf performance was completed at Front Royal. Weight-age curves studied at the Texas station indicate that individuals within breeds follow a characteristic pattern for that breed. Optimum slaughter weights for steers produced by breeds of different sizes were found to vary considerably.

From the basic beef cattle genetics laboratory at the Texas station progress was reported in the development of anti-sera reagents and electrophoretic techniques. Also development of in vitro techniques for culturing bovine tissue were reported. These techniques have revealed similar karyotypes for dwarf and normal cattle and a difference in the Y chromosome of B. taurus and B. indicus cattle.

Work at several locations was continued to further clarify relationships

between feed conversion, gaining ability and mothering ability. In an analysis of data at North Carolina the genotype of calf for weight and the dam's genotype for maternal influence had about equal influence on variance of 180-day weight.

Studies of the progress expected from selection by different procedures are continuing in Florida, Georgia, Louisiana, Kentucky, Virginia and Mississippi. Reports are of a preliminary nature.

During the year two Hereford hydrocephalic calves were observed in one of the Front Royal inbred lines. They were documented by photographs, x-rays, and shown to have pedigrees with a common source of the gene.

A manuscript was prepared summarizing observations of the incidence of a founder-like anomaly in a group of performance tested Hereford bulls at the Arkansas station. This anomaly was shown to be associated with high blood calcium levels, calcium deposits in certain tissues and atrophy of the parathyroid.

The studies of the embryology and biochemical properties of the body fluids of dwarf cattle were continued at the Florida station.

4. USEFULNESS OF FINDINGS:

Results from this project have been a continuing source of information for breeders and have been made available by technical committee members and others associated with the work at breed conferences, field days, short courses and in popular publications. Each year there is an increasing number of commercial breeders seeking information on the crossbreeding and its systematic use. There is an increasing number of purebred breeders seeking guidance in their selection and breeding program. Eight states have bull testing stations to aid breeders in their evaluations.

5. WORK PLANNED FOR NEXT YEAR:

Investigations will proceed according to project outline. Special committees concerned with standardization of records and data collection and analysis are active.

6. PUBLICATIONS ISSUED OR MANUSCRIPTS PREPARED DURING THE YEAR:

See attached list.

7. APPROVED:

Date

Chairman, Technical Committee

Date

Regional Administrative Advisor

TABLE 1. Cattle Inventory and Percent Used in S-10 Contributing Projects
July 1, 1966

State	Cows two years and over	Year- ling Heifers	Bulls and steers under one yr.	Heifers under one yr.	Bulls over one yr.	Steers over one yr.	Total Number	Percent used in Project
Alabama	390	59	157	145	29	33	813	100
Arkansas	317	84	123	137	61	--	722	100
Florida	3260	977	1333	1354	216	--	7140	74
Georgia	663	209	239	260	31	60	1462	96
Kentucky	331	103	77	51	30	--	592	100
Louisiana	408	55	102	100	19	--	684	100
Mississippi	453	92	----	---	--	--	545	80
North Carolina	250	97	126	118	6	68	665	88
South Carolina	252	69	64	83	23	--	491	--
Tennessee	1011	212	388	348	110	--	2069	100
Texas	471	94	169	188	40	28	990	100
Virginia	118	--	54	55	12	--	239	100
Subtotal	7924	2051	2832	2839	577	189	16412	
Federal-State Cooperative Stations:								
Brooksville, Florida	456	73	157	154	100	--	940	100
Jeanerette, Louisiana	221	95	51	56	54	17	494	100
Front Royal, Virginia	453	119	167	169	49	--	957	100
Subtotal	1130	287	375	379	203	17	2391	
Total	9054	2338	3207	3218	780	206	18803	

TABLE 2. Numbers of Animals Performance Tested and Slaughtered
from S-10 Contributing Projects in 1965-1966

State	Performance Tested			Slaughtered		
	Bulls	Heifers	Steers	Bulls	Heifers	Steers
Alabama	27	142	114	-	-	114
Arkansas	258	-	-	51	-	-
Florida	55	280	96	-	-	96
Georgia	57	121	60	7	10	60
Kentucky	44	54	26	38	15	26
Louisiana	9	28	89	9	28	89
Mississippi	-	-	40	-	-	40
North Carolina	18	93	56	16	-	56
South Carolina	18	65	39	14	-	39
Tennessee	104	201	163	-	110	163
Texas	44	183	76	-	12	67
Virginia	-	55	50	-	55	50
Subtotal	634	1222	809	135	230	800
Brooksville, Florida	80	121	26	30	77	56
Jeanerette, Louisiana	57	-	28	24	-	28
Front Royal, Virginia	74	120	-	-	-	-
Subtotal	211	241	54	54	77	84
Total	854	1463	863	189	307	884

TABLE 3. Funds Expended on Beef Cattle Breeding Research in S-10 Herds During the Fiscal Year Ending June 30, 1966

State	Regional Research Funds	AHRD Funds	State- Controlled Funds	Income from Cattle
Alabama	25,498.00		37,120.00	33,764.48
Arkansas	13,600.00		64,723.00	40,000.00
Florida			262,967.00	189,497.00
Georgia	6,250.00	4,940.00	20,000.00	26,690.00
Kentucky	29,873.00		31,384.00	18,200.00
Louisiana	18,500.00		67,131.00	41,035.31
Mississippi	13,900.00		18,000.00	34,000.00
North Carolina	13,444.00	1,800.00	51,000.00	22,000.00
South Carolina	9,776.46		12,902.76	23,220.00
Tennessee				
Texas			123,690.00	82,404.53
Virginia				
Brooksville, Florida		68,947.00	49,370.42	57,918.71
Jeanerette, Louisiana		72,340.00	90,649.00	52,256.13
Front Royal, Virginia				
Total				

STATE REPORTS

AUBURN UNIVERSITY
Agricultural Experiment Station
Auburn, Alabama

I. PROJECT: Hatch 219 (S-10)

The Effect of Environment, Genetic-Environmental Interaction and Heterosis on Performance of Beef Cattle.

II. OBJECTIVES:

To evaluate the effect of environment and genetic-environmental interaction on genetic progress under phenotypic selection.

To determine the effectiveness of selection for total performance in beef cattle.

To determine the influence of heterosis on rate of gain carcass quality and cow performance.

III. PERSONNEL:

T. B. Patterson and G. B. Meadows

IV. ACCOMPLISHMENTS DURING THE YEAR:

1. Scope and nature of work

Ninety-six purebred Angus and eighty-two purebred Hereford females were divided into two similar groups. The calves from one group of Angus and Hereford females will be placed on a high nutrition regime from birth to approximately 15 months of age. The other groups¹ of calves will be on a standard nutrition regime with no additional feed from birth to weaning other than that provided by mothers milk and pasture. Selection by index for replacements will be on a within group bases.

The crossbreeding study currently has 126 cows of Angus, Hereford, Shorthorn and reciprocal crosses breeding. These cows are bred to purebred Angus, Hereford and Shorthorn bulls to produce two-breed and three-breed cross calves.

2. Research results

Since the genetic-environmental portion of the study was initiated on July 1, 1965 no results are available.

Limited data are available for the crossbreeding study. A summary of the performance of the two groups of crossbred calves from birth to weaning is shown in Table 1. These differences have been approximately the same magnitude and favoring the three-breed cross calves in each of the four years. A three year summary for the steer calves are shown in

TABLE 1. PERFORMANCE OF TWO-BREED AND THREE-BREED
CROSSBRED CALVES FROM BIRTH TO WEANING--FOUR YEAR SUMMARY

	No. of Calves	Birth Wt.	Actual Weaning Wt.	Adjusted Weaning Wt.
	No.	lb.	lb.	lb.
3-Breed Cross				
Steers	69	66.3	456.3	474.0
Heifers	46	63.7	424.2	467.3
Average	115	65.3	443.5	471.3
2-Breed Cross				
Steers	36	66.6	431.2	449.7
Heifers	48	62.1	406.3	451.3
Average	84	64.0	416.9	450.6
Difference		1.3	26.6	20.7

Table 2. The small differences that are shown here also hold true for the heifers that were grown out separately.

A post-weaning performance test was conducted for 103 bulls, 18 steers and 79 heifers.

TABLE 2. POST-WEANING PERFORMANCE OF TWO-BREED AND THREE-
BREED CROSSBRED STEERS--THREE YEAR SUMMARY

	No. of Steers	Feedlot A.D.G.	Federal Carcass Grade	Adj. Ribeye/ Cwt. Carcass	Fat Thickness
	No.	lb.		Sq. in.	in.
3-Breed Cross	44	1.82	13.5	1.94	0.82
2-Breed Cross	27	1.88	13.4	1.87	0.68
Difference		0.06	0.1	0.07	0.14

V. FUTURE PLANS:

The project will be continued on the present basis.

VI. PUBLICATIONS DURING THE YEAR:

Summary Beef Cattle Performance Test.

VII. PUBLICATIONS PLANNED:

None

Submitted by: T. B. Patterson

I. PROJECT: Animal Science 4-016

A Comparison of Crossbreeding and Within Breed Selection on Beef Cattle Production in the Black Belt Area of Alabama.

II. OBJECTIVES:

To evaluate the significance of hybrid vigor in various crosses of beef cattle with regard to production of slaughter calves, stocker or feeder steers and slaughter steers.

To determine the effect of heterosis on mothering ability, adaptability and fertility.

III. PERSONNEL:

T. B. Patterson, L. A. Smith and Harold Grimes

IV. ACCOMPLISHMENTS DURING THE YEAR:

1. Scope and nature of work

Seventy-five brood cows (18 Hereford, 26 Angus-Hereford and 26 Brahman-Hereford) are devoted to this study. Data collected include weaned weights and grades on all calves, and postweaning performance and carcass information on all steer calves.

2. Research results.

Sufficient numbers of calves are now available to show definite trends for the different breeding groups. A summary of the different breeding groups from birth to weaning is shown in Table 1. The difference in weaned weight in favor of crossbred calves over straight bred controls is consistent with current and previous studies at the Alabama Station.

TABLE 1. PERFORMANCE OF CROSSBRED CALVES FROM BIRTH TO WEANING BLACK BELT SUBSTATION--FIVE YEAR SUMMARY

	BREED COMPOSITION OF STEERS			
	3/4 Hereford		3/4 Angus	7/8 Hereford
	Hereford	1/4 Angus	1/4 Hereford	1/8 Brahman
No. of calves	76	48	46	92
Adjusted weaned wt. lb.	462.4	520.1	507.4	485.8
Slaughter grade	9.7	10.6	10.5	9.6
% calf crop weaned	85.9	92.3	85.2	88.8

A four year summary of the post-weaning performance of the steers is shown in Table 2.

TABLE 2. PERFORMANCE OF CROSSBRED STEER CALVES, WEANING TO
SLAUGHTER--FOUR YEAR SUMMARY

	BREED COMPOSITION OF STEERS			
	Hereford	3/4 Hereford 1/4 Angus	3/4 Angus 1/4 Hereford	7/8 Hereford 1/8 Brahman
No. of steers	27	11	12	30
Post-weaning av. daily gain, lb.	2.10	2.13	1.89	2.04
Final shrunk wt., lb.	963	1021	950	994
Federal carcass grade	10.6	11.2	12.5	10.1

There are indications of compensatory gain during the post-weaning period when the steers are free of crossbred cow maternal influence.

V. FUTURE PLANS:

The project will be continued on the present basis.

VI. PUBLICATIONS DURING THE YEAR:

Cooper, Ralph C. 1965. Crossbreeding of Beef Cattle for Slaughter Calf Production in the Black Belt of Alabama. Master's Thesis. Auburn University, Auburn, Alabama.

VII. PUBLICATIONS PLANNED:

None

Submitted by T. B. Patterson

I. PROJECT: Animal Science 4-017

The Effects of Breed and Breed Crosses on Milk Production and on Other Production Factors in a Grade Beef Herd.

II. OBJECTIVES:

To determine the effect of Brown Swiss, Holstein and Charolais breeding on (a) milk production, (b) weaning weights and grades, (c) feedlot performance, and (d) carcass desirability.

To evaluate methods of increasing milk production in a grade beef herd through use of selected bulls from different breeds.

III. PERSONNEL:

T. B. Patterson, W. W. Cotney and R. A. Moore

IV. ACCOMPLISHMENTS DURING THE YEAR:

1. Scope and nature of work

Seventy-five grade Hereford cows were divided into similar groups of 25 each on the basis of age, breeding, and previous production record. They were bred to Hereford (control), Brown Swiss, and Charolais bulls. The bulls have been changed each year and the cows redivided to minimize sampling differences. In addition, grade Holstein cows have been bred to the Hereford control bulls to produce a fourth group of calves.

The females thus produced will serve as foundation stock for the project. The foundation females will be backcrossed to Hereford bulls selected from known high milking dams. Milk production, weaning weights, and grades will be determined for each generation (three generations of backcrosses). In addition, post-weaning performance and carcass information will be obtained.

2. Research results

The second set of calves were weaned during the year and the steer calves finished in the feedlot and slaughtered. Differences in weaned weights were not as large the second year as they were the first year. The second year results are shown in Table 1. Even though the differences between groups were small at weaning, by the end of the feedlot period

TABLE 1. WEANING DATA FOR 1964-65 CALF CROP
UPPER COASTAL PLAIN SUBSTATION WINFIELD

	Breeding Group		
	Hereford	Charolais	Brown Swiss
No. of calves weaned	23	19	23
% calf crop weaned	92.0	79.2	100
Av. birth wt., lb.	63.4	67.2	67.2
Av. adj. weaned wt., lb.	453.4	462.9	455.1
Av. weaned grade	9.1	8.6	8.2

they were approximately the same as the previous year. The data for the second group of calves are shown in Table 2.

TABLE 2. POST-WEANING PERFORMANCE AND CARCASS
DATA 1964-65 STEER CALVES. UPPER COASTAL PLAIN SUBSTATION
WINFIELD

	Breeding Group		
	Hereford	Charolais	Brown Swiss
No. steers	14	9	12
Actual weaned wt., lb.	439.6	478.8	467.9
Gain on pasture, lb.	102.5	133.8	108.3
Final wt. (shrunk) lb.	948.9	1022.7	998.3
Gain in feedlot (185 days) lb.	406.8	410.1	422.1
Carcass grade	12.7	11.6	10.8
Yield grade	2.9	2.1	2.4
Ribeye area/cwt. carcass, sq. in.	1.96	2.12	1.98

V. FUTURE PLANS:

The project will be continued on present basis.

VI. PUBLICATIONS DURING THE YEAR:

None

VII. PUBLICATIONS PLANNED:

None

Production, Inventory, and Performance Data, S-10 Herds - 1965-1966

State Alabama

Location		Auburn	Auburn	Auburn	Auburn	Auburn
Breed of sire		Angus	Hereford	Angus	Angus	Hereford
Breed of dam		Angus	Hereford	Hereford	Shorthorn	Angus
Line or group ¹		Purebred	Purebred	Cross-breeding	Cross-breeding	Cross-breeding
Percent used in project		100%	100%	100%	100%	100%
Inventory as of July 1, 1966	Cows 2 years and over	82	66	9	9	9
	Yearling heifers	14	15	0	0	0
	Bulls and steers under 1 year	17	23	2	5	5
	Heifers under 1 year	27	24	5	2	4
	Bulls over 1 year	6	15	0	0	0
	Steers over 1 year	6	5	1	1	0
Repro. perf.	Percent pregnant ²	64.8	86.4	100.0	62.5	88.9
	Calf survival percent ³	95.6	96.1	100.0	100.0	87.5
Wean. perf.	Adj. ADG ⁴	1.64	1.56	1.48	1.52	1.56
	Av. type sc. ⁵	11.3	12.2	11.2	12.5	12.0
Postweaning Performance	No. of bulls	11	16	0	0	0
	No. of heifers	22	19	5	4	6
	No. of steers	12	7	2	1	1
Slaughtered	No. of bulls	0	0	0	0	0
	No. of heifers	0	0	0	0	0
	No. of steers	12	7	2	1	1
Remarks						

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent or percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustments:

5 - Suggest S-10 scoring system; indicate if different.

Production, Inventory, and Performance Data, S-10 Herds - 1965-1966

State Alabama

Location		Auburn	Auburn	Auburn	Auburn	Auburn
Breed of sire		Hereford	Shorthorn	Shorthorn	Angus	Angus
Breed of dam		Shorthorn	Angus	Hereford	Hereford X Shorthorn	Shorthorn X Hereford
Line or group ¹		Cross-breeding	Cross-breeding	Cross-breeding	Cross-breeding	Cross-breeding
Percent used in project		100%	100%	100%	100%	100%
Inventory as of July 1, 1966	Cows 2 years and over	9	9	9	12	12
	Yearling heifers	0	0	0	0	0
	Bulls and steers under 1 year	6	1	3	5	3
	Heifers under 1 year	3	5	2	3	3
	Bulls over 1 year	0	0	0	0	0
	Steers over 1 year	0	3	1	5	3
Repro. perf.	Percent pregnant ²	14.3	66.7	71.4	88.9	80.0
	Calf survival percent ³	100.0	83.3	100.0	100.0	100.0
Wean. perf.	Adj. ADG ⁴	1.54	1.56	1.33	1.48	1.69
	Av. type sc. ⁵	12.0	11.5	11.3	10.7	12.0
Postweaning performance	No. of bulls	0	0	0	0	0
	No. of heifers	1	2	3	3	3
	No. of steers	0	3	2	5	5
Slaughtered	No. of bulls	0	0	0	0	0
	No. of heifers	0	0	0	0	0
	No. of steers	0	3	2	5	5
Remarks						

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent or percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustments: Mature dam, steer equivalent.

5 - Suggest S-10 scoring system; indicate if different.

Production, Inventory, and Performance Data, S-10 Herds - 1965-1966

State Alabama

Location		Auburn	Auburn	Auburn	Auburn
Breed of sire		Hereford	Hereford	Shorthorn	Shorthorn
Breed of dam		Angus X Shorthorn	Shorthorn X Angus	Angus X Hereford	Hereford X Angus
Line or group ¹		Cross- breeding	Cross- breeding	Cross- breeding	Cross- breeding
Percent used in project		100%	100%	100%	100%
Inventory as of July 1, 1966	Cows 2 years and over	1	12	11	14
	Yearling heifers	0	0	0	0
	Bulls and steers under 1 year	4	7	0	5
	Heifers under 1 year	6	5	3	0
	Bulls over 1 year	0	0	0	0
	Steers over 1 year	2	1	3	2
Repro. perf.	Percent pregnant ²	100.0	100.0	57.1	88.9
	Calf survival percent ³	100.0	100.0	100.0	87.5
Wean. perf.	Adj. ADG ⁴	1.62	1.67	1.58	1.51
	Av. type sc. ⁵	11.0	11.8	12.0	11.0
Postweaning performance	No. of bulls	0	0	0	0
	No. of heifers	1	4	1	3
	No. of steers	5	3	3	4
Slaughtered	No. of bulls	0	0	0	0
	No. of heifers	0	0	0	0
	No. of steers	5	3	3	4
Remarks					

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent or percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustments: Mature dam, steer equivalent.

5 - Suggest S-10 scoring system; indicate if different.

Production, Inventory, and Performance Data, S-10 Herds - 1965-1966

State Alabama

Location		Black Belt Substation	Black Belt Substation	Black Belt Substation	Black Belt Substation	
Breed of sire		Hereford	Hereford	Hereford	Angus	
Breed of dam		Hereford	3/4 Here. 1/4 Brah.	1/2 Angus 1/2 Here.	1/2 Angus 1/2 Here.	
Line or group ¹		Cross-breeding	Cross-breeding	Cross-breeding	Cross-breeding	
Percent used in project		100	100	100	100	
Inventory as of July 1, 1966	Cows 2 years and over	18	26	13	13	
	Yearling heifers	0	0	0	0	
	Bulls and steers under 1 year	12	11	10	6	
	Heifers under 1 year	5	15	3	7	
	Bulls over 1 year	2	0	0	1	
	Steers over 1 year	0	0	0	0	
Repro. perf.	Percent pregnant ²	100	88.9	100	93.3	
	Calf survival percent ³	100	95.7	100	100	
Wean. perf.	Adj. ADG ⁴	1.55	1.51	1.67	1.78	
	Av. type sc. ⁵	11.4	9.6	10.6	10.5	
Postweaning performance	No. of bulls	0	0	0	0	
	No. of heifers	9	11	8	7	
	No. of steers	8	11	3	4	
Slaughtered	No. of bulls	0	0	0	0	
	No. of heifers	0	0	0	0	
	No. of steers	8	11	3	4	
Remarks						

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent or percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustments: Mature dam, steer equivalent.

5 - Suggest S-10 scoring system; indicate if different.

Production, Inventory, and Performance Data, S-10 Herds - 1965-1966

State Alabama

Location	Winfield	Winfield	Winfield		
Breed of sire	Hereford	Charolais	Brown Swiss		
Breed of dam	Grade Hereford	Grade Hereford	Grade Hereford		
Line or group ¹	Cross-breeding	Cross-breeding	Cross-breeding		
Percent used in project	100	100	100		
Inventory as of July 1, 1966	Cows 2 years and over	15	16	25	
	Yearling heifers	9	10	11	
	Bulls and steers under 1 year	11	12	9	
	Heifers under 1 year	7	8	8	
	Bulls over 1 year	3	1	1	
	Steers over 1 year	0	0	0	
Repro. perf.	Percent pregnant ²	92.0	91.7	100	
	Calf survival percent ³	100.0	86.4	100.0	
Wean. perf.	Adj. ADG ⁴	1.56	1.58	1.55	
	Av. type sc. ⁵	11.1	11.0	8.2	
Postweaning performance	No. of bulls	0	0	0	
	No. of heifers	9	10	11	
	No. of steers	14	9	12	
Slaughtered	No. of bulls	0	0	0	
	No. of heifers	0	0	0	
	No. of steers	14	9	12	
Remarks					

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent or percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustments: Mature dam, steer equivalent.

5 - Suggest S-10 scoring system; indicate if different.

UNIVERSITY OF ARKANSAS
Agricultural Experiment Station
Fayetteville, Arkansas

I. PROJECT: Hatch 170 (S-10)

Evaluation of Performance Records of Beef Cattle

II. OBJECTIVES:

To continue to develop practical but adequate methods for identifying, evaluating, and propagating the genetic potential for the production of beef. This would involve determining the kind and number of performance records to prove beef sires and dams, as well as proper use of records in planning matings.

III. PERSONNEL:

C. J. Brown, M. C. Heck, R. S. Honea, and Frank Scaramuzza

IV. ACCOMPLISHMENTS DURING THE YEAR:

Improvement of facilities has continued with the clearing of brush and seeding of about 100 acres of additional pasture. A war surplus bulldozer was acquired to facilitate this development. Data were collected in accordance with the long range objectives of the project. The scope and nature of these data are indicated. All cattle (444 head) under two years of age were weighed monthly and measured with steel tape and calipers quarterly. All cattle over two years of age (252) were weighed and measured semi-annually. All cattle were classified (563) in July by four judges working independently. Ninety-nine bulls were individually fed on a performance test. Fifty-one of these bulls were slaughtered to obtain carcass measurements, cut-out data and eating quality scores by a taste panel.

In the companion state project under which bulls are fed for cooperating breeders, 160 bulls were individually fed at three locations in the state.

A study of death losses at birth in the purebred Angus and Hereford herds was made. During a 12 year period 1073 Angus and 904 Hereford calves were born. There was a higher death loss in males than females (4.2 vs. 2.6 percent) and a higher death loss in Hereford than Angus (5.9 vs. 2.2 percent). There were slightly higher losses among Hereford cows at all ages up to 10 years of age but the greatest difference occurred at the first parturitions during which 12.3 percent of the Herefords and 2.7 percent of the Angus failed to survive for 24 hours. There was a slight tendency for higher losses earlier in the calving season both during the spring and fall calving seasons.

An analysis of factors influencing birth weight is in progress. Also a study concerned with some factors associated with founder occurring in a group of Hereford cattle is being carried out.

V. FUTURE PLANS:

Continue routine observations according to project outline. Complete birth weight and founder studies.

VI. PUBLICATIONS DURING THE YEAR:

Brown, C. J., R. S. Honea and Frank Scaramuzza. 1966. Some factors influencing death losses of calves at birth. 2nd Ark. Ani. Sci. Res. Conf., p. 5.

Brown, C. J., R. S. Temple, C. B. Ramsey, P. K. Lewis, Jr., and M. C. Heck. 1966. Ultrasonic and carcass measurements of young bulls. 2nd Ark. Ani. Sci. Res. Conf., p. 38.

Brown, C. J. and Carl Lueker. 1965. Performance of bulls on Arkansas Cooperative Beef Bull Performance Test 3. Ark. Agr. Expt. Sta. Rpt. Series 141.

Brown, C. J., P. K. Lewis, Jr., and M. C. Heck. 1966. Evaluating beef carcasses from ribeye area measurement. Ark. Farm. Res. 15:2.

Smith, J. P. 1965. The relationship of agonistic behavior to production traits in young beef bulls. Masters Thesis, U. of A. Library.

Smith, J. P. and C. J. Brown. 1965. Agonistic behavior and production traits of young beef bulls. J. Ani. Sci. 24:856. (abstract)

Melton, Curtis and C. J. Brown. 1965. Beef bull performance and secondary sex characteristics. J. Ani. Sci. 24:282. (abstract)

Brown, C. J. 1965. Some factors affecting gain of beef bulls. J. Ani. Sci. 24:287. (abstract)

VII. PUBLICATIONS PLANNED:

Publication on sire and feedlot performance.

Publication on relationship of carcass composition and performance.

Publication on birth weight.

Publication on founder.

Submitted by: C. J. Brown

Production, Inventory, and Performance Data, S-10 Herds - 1965-1966

State Arkansas

Location	Fayetteville	Fayetteville	Fayetteville	Fayetteville
Breed of sire	Hereford	Angus	Hereford	Angus
Breed of dam	Hereford	Angus	Hereford	Angus
Line or group ¹	Purebred	Purebred	Purebred	Purebred
Percent used in project	100%	100%	100%	100%
Inventory as of July 1, 1966	Cows 2 years and over	133	184	
	Yearling heifers	33	51	
	Bulls and steers under 1 year	50	73	
	Heifers under 1 year	59	78	
	Bulls over 1 year	24	37	
	Steers over 1 year	Fall 1964	Calf Crop	Spring 1965 Calf Crop
Repro. perf.	Percent pregnant ²	81%	87%	93%
	Calf survival percent ³	95%	89%	82%
Wean. perf.	Adj. ADG ⁴	1.42	1.54	1.52
	Av. type sc. ⁵	12	13	12
Postweaning performance	No. of bulls	21	27	18
	No. of heifers	17	24	16
	No. of steers	--	--	--
Slaughtered	No. of bulls	10	14	10
	No. of heifers	--	--	--
	No. of steers	--	--	--
Remarks				

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent or percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustments:

5 - Suggest S-10 scoring system; indicate if different.

State Arkansas

Location		Hope	Hope	Hope	Hope	Hope
Breed of sire		Hereford	Red Poll	Shorthorn	Charolais	Santa Gertrudis
Breed of dam		Hereford	Red Poll	Shorthorn	Charolais	Santa Gertrudis
Line or group ¹		Purebred	Purebred	Purebred	Purebred	Purebred
Percent used in project		100	100	100	100	100
Inventory as of July 1, 1966	Cows 2 years and over					
	Yearling heifers					
	Bulls and steers under 1 year					
	Heifers under 1 year					
	Bulls over 1 year					
	Steers over 1 year					
Repro. perf.	Percent pregnant ²					
	Calf survival percent ³					
Wean. perf.	Adj. ADG ⁴					
	Av. type sc. ⁵					
Postweaning performance	No. of bulls	20	3	2	2	13
	No. of heifers					
	No. of steers					
Slaughtered	No. of bulls					
	No. of heifers					
	No. of steers					
Remarks						

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent or percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustments:

5 - Suggest S - 10 scoring system; indicate if different.

These bulls were individually fed on State Project 565 for cooperating breeders.

Production, Inventory, and Performance Data, S-10 Herds - 1965-1966

State Arkansas

Location	Newport	Newport	Newport	Newport	Newport
Breed of sire	Angus	Hereford	Red Poll	Charolais	Santa Gertrudis
Breed of dam	Angus	Hereford	Red Poll	Charolais	Santa Gertrudis
Line or group ¹	Purebred	Purebred	Purebred	Purebred	Purebred
Percent used in project	100	100	100	100	100
Inventory as of July 1, 1966	Cows 2 years and over				
	Yearling heifers				
	Bulls and steers under 1 year				
	Heifers under 1 year				
	Bulls over 1 year				
	Steers over 1 year				
Repro. perf.	Percent pregnant ²				
	Calf survival percent ³				
Wean. perf.	Adj. ADG ⁴				
	Av. type sc. ⁵				
Postweaning performance	No. of bulls	32	15	2	2
	No. of heifers				
	No. of steers				
Slaughtered	No. of bulls				
	No. of heifers				
	No. of steers				
Remarks					

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent or percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustments:

5 - Suggest S-10 scoring system; indicate if different.

These bulls were individually fed on State Project 565 for cooperating breeders.

Production, Inventory, and Performance Data, S-10 Herds - 1965-1966

State Arkansas

Location	Fayetteville	Fayetteville	Fayetteville	Fayetteville	Fayetteville
Breed of sire	Angus	Hereford	Red Poll	Brangus	Charolais
Breed of dam	Angus	Hereford	Red Poll	Brangus	Charolais
Line or group ¹	Purebred	Purebred	Purebred	Purebred	Purebred
Percent used in project	100	100	100	100	100
Inventory as of July 1, 1966	Cows 2 years and over				
	Yearling Heifers				
	Bulls and steers under 1 year				
	Heifers under 1 year				
	Bulls over 1 year				
	Steers over 1 year				
Repro. perf.	Percent pregnant ²				
	Calf survival percent ³				
Wean. perf.	Adj. ADG ⁴				
	Av. type sc. ⁵				
Postweaning performance	No. of bulls	11	32	3	13
	No. of heifers				
	No. of steers				
Slaughtered	No. of bulls				
	No. of heifers				
	No. of steers				
Remarks					

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent or percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustments:

5 - Suggest S-10 scoring system; indicate if different.

These bulls were individually fed on State Project 565 for cooperating breeders.

UNIVERSITY OF FLORIDA
Agricultural Experiment Station
Gainesville, Florida

I. PROJECT: 1003

Inherent body size in cattle as related to adaptation to Florida's climatic environment.

II. OBJECTIVES:

To determine the performance of three different groups of beef cattle selected respectively for:

- (a) Large skeletal and body size,
- (b) Adaptation to Florida climate as reflected in thrift and vitality, and
- (c) The combination of weight and grade to give the greatest economic returns per animal unit.

III. PERSONNEL:

M. Koger, F. S. Baker and A. C. Warnick

IV. ACCOMPLISHMENTS:

Three groups of 250 cows each are being used in a selection experiment. One group is being selected for large skeletal size to determine the effect this trait has on adaptability to Florida. Another group is being selected for indications of adaptability, measured mainly by condition score to determine whether animals selected for this trait tend toward any particular size. The third group serves as a control. The project has not been under way long enough for the groups to become distinct.

V. FUTURE PLANS:

Continue project as outlined.

VI. PUBLICATIONS:

None

VII. PUBLICATIONS PLANNED:

None

UNIVERSITY OF FLORIDA
Agricultural Experiment Station
Gainesville, Florida

I. PROJECT: 627 (revised)

Pasture programs and cattle breeding systems for beef production on flat-woods soils of Northcentral Florida.

II. OBJECTIVES:

- (1) To determine the relative cost of three pasture programs for beef production with a cow-calf operation.
- (2) To compare the effectiveness of four different breeding systems in improving the production of beef cattle.
- (3) To evaluate systems for growing heavy calves to market weight and grade.

III. PERSONNEL:

M. Koger, W. G. Blue, G. B. Killinger, J. M. Myers and R. E. L. Greene

IV. ACCOMPLISHMENTS:

Two hundred ten females of breeding age were used during 1964-65 in evaluating four breeding programs which were initiated in 1952 with a foundation of Brahman-Native females:

- (1) Upgrading to British sire (Angus and Hereford)
- (2) Crisscrossing Angus and Hereford,
- (3) Crisscrossing Angus and Brahman, and
- (4) Crisscrossing Hereford and Santa Gertrudis

Weaning data from the 1965 calf crop are presented in form S-10-1.

The data from 5 years (1960-64) were analysed in preparation for publication. The average production per cow for the four groups above considering both weaning weight of calves and weaning percent was 451, 493, 428, and 476 lbs., respectively.

V. FUTURE PLANS:

Present procedures will be continued until blood composition becomes stable enough to evaluate the programs. The data from feeding steers produced in the four programs will be summarized for presentation.

VI. PUBLICATIONS:

None

VII. PUBLICATIONS PLANNED:

Station bulletin summarizing data from 1960-1964.

UNIVERSITY OF FLORIDA
Agricultural Experiment Station
Gainesville, Florida

I. PROJECT: 1136 (Hatch)

Biochemical and cytological investigations of inherited dwarfism in beef cattle.

II. OBJECTIVES:

- (1) To determine biochemical abnormalities in body fluids and tissues which may serve to identify carriers of the dwarfism trait.
- (2) To determine the cytogenetic characteristics of dwarf, carrier and non-carrier cattle.

III. PERSONNEL:

J. R. Crockett, F. C. Neal and M. Koger

IV. ACCOMPLISHMENTS:

Embryology of the dwarf, carrier and non-carrier is being continued in order to bracket the age at which dwarf characteristics first become evident. Electrophoretic studies are being made on various body fluids. Detailed studies on skeletal development are being made through use of radiographs.

V. FUTURE PLANS:

Embryological studies are nearing completion. Unless funds are obtained to pursue biochemical studies, the project will be terminated with embryo studies.

VI. PUBLICATIONS:

Patton, James D., J. R. Crockett and James A. Gavan. 1966. Prenatal skeletal development in the bovine. J. Animal Science 25:251, Abstract.

VII. PUBLICATIONS PLANNED:

Dissertation on embryological studies.

EVERGLADES EXPERIMENT STATION
Belle Glade, Florida

I. PROJECT: 922

Angus, Brangus, and Angus X Brangus crossbreds for beef production in the Everglades area.

II. OBJECTIVES:

- (1) To compare the performance of straightbred Angus and Brangus cattle with rotation crosses of the two breeds for beef production in the Everglades area.
- (2) To develop a highly productive herd of cattle at the State Prison Farm through selection based on production testing.

III. PERSONNEL:

M. Koger, R. W. Kidder and Dan Beardsley

IV. ACCOMPLISHMENTS:

There were 1378 females of breeding age in the project. Blood composition has not yet stabilized to the point that the performance of different breed groups can be evaluated.

V. FUTURE PLANS:

Continue groups until blood composition in the various breed groups stabilizes and performance can be evaluated.

VI. PUBLICATIONS:

None

VII. PUBLICATIONS PLANNED:

None

EVERGLADES EXPERIMENT STATION
Belle Glade, Florida

I. PROJECT: 990

Breeding beef cattle for adaptation to South Florida conditions.

II. OBJECTIVES:

- (1) To compare the performance of progeny from Angus, Brahman and Hereford cattle, and from three possible two-breed rotational crosses of these breeds for beef production in the South Florida area.
- (2) To develop through selection Angus and Hereford cattle which will be adapted to South Florida conditions.

III. PERSONNEL:

R. W. Kidder, Dan Beardsley and C. E. Haines

IV. ACCOMPLISHMENTS:

There were 353 females bred in the project. There are six different breeding groups including Angus, Brahman Hereford and the three possible two-breed rotation crosses utilizing purebred bulls mated to crossbred cows. Representative straight bred and crossbred cows, along with their calves were fed under controlled conditions to determine efficiency of feed conversion by producing cows. The weaning data from the 1965 calf crop are shown in form S-10-1.

V. FUTURE PLANS:

Continue the project as outlined. Representative steers from the different breed groups will be evaluated in grazing and feedlot trials.

VI. PUBLICATIONS:

Chapman, H. L., R. W. Kidder, M. Koger, J. R. Crockett and W. K. McPherson. 1965. Blackstrap Molasses for Beef Cows. Fla. Agri. Experiment Station Bul. 701.

VII. PUBLICATIONS PLANNED:

Preliminary results from crossbreeding with Angus, Brahman and Hereford cattle. Feed conversion by crossbred and straightbred cows.

RANGE CATTLE STATION
Ona, Florida

I. PROJECT: 615 (revised)

Influence of breed composition and level of nutrition on adaptability of cattle to Central Florida conditions.

II. OBJECTIVES:

To determine the relative productivity of cows with different proportions of British and Brahman blood when run under pasture conditions designed to supply low, medium and good nutrition levels.

III. PERSONNEL:

F. M. Peacock, H. L. Chapman, and M. Koger.

IV. ACCOMPLISHMENTS:

For the fourteenth year, cows of Brahman (B), Shorthorn (S), 1/2B 1/2S, 3/4B 1/4S, and 1/4B 3/4S were maintained on three nutrition levels and production performance compared. The project involved 194 cows 2 years of age and older. The production performance for 1965 is summarized in form S-10-1.

V. FUTURE PLANS:

The data obtained during 1966 will complete this study. The data will be analysed and results published.

VI. PUBLICATIONS FOR YEAR:

None

VII. PUBLICATIONS PLANNED:

The data from the completed trial will be summarized and published as a bulletin or journal article.

RANGE CATTLE EXPERIMENT STATION
Ona, Florida

I. PROJECT: 1120

Charolais, Brahman, Angus and their crosses for beef production in South Florida

II. OBJECTIVES:

To evaluate the relative productivity of Charolais, Brahman, Angus and their crosses for beef production in South Florida.

III. PERSONNEL:

F. M. Peacock, E. M. Hodges, H. L. Chapman and M. Koger

IV. ACCOMPLISHMENTS:

Angus, Brahman and Charolais bulls are being mated to females of the same breeds in all possible combinations to produce straightbred and crossbred progeny. The three groups of F₁ females likewise will be mated to the three breeds of bulls to produce backcross and three-breed cross progeny. A minimum of 90 straightbred females (10 per subgroup) are bred each year. A comparable number of crossbred females will be added to the project as they are produced. The postweaning and feedlot performance of progeny produced in the trial are evaluated in a companion study. The second calf crop was weaned in 1965. The data are summarized in form S-10-1.

V. FUTURE PLANS:

Continue project as outlined.

VI. PUBLICATIONS:

None

VII. PUBLICATIONS PLANNED:

None

NORTH FLORIDA EXPERIMENT STATION
Quincy, Florida

I. PROJECT: 1180

Selection of replacement females in beef cattle.

II. OBJECTIVES:

To compare genetic progress and economic returns from selecting replacements on their own calfhood performance versus selection on the basis of production records.

III. PERSONNEL:

F. S. Baker, Jr. and M. Koger

IV. ACCOMPLISHMENTS:

This is a new project and the 1966 calf crop will represent the first years production following the initiation of the selection procedures outlined for females. The weaning data from the 1965 calf crop is summarized in form S-10-1.

V. FUTURE PLANS:

Continue project as outlined.

VI. PUBLICATIONS:

None

VII. PUBLICATIONS PLANNED:

None

State Florida

Location		Gaines- ville	Gaines- ville	Gaines- ville	Gaines- ville	Quincy
Breed of sire		A, H	A, H	A, B	H, SG	Angus
Breed of dam		gr. A, gr. H	Crossbred	Crossbred	Crossbred	Angus
Line or group ¹		Straight- bred	A X H crisscross	A X B crisscross	H X SG crisscross	selection ^a
Percent used in project		50	50	50	50	50
Inventory as of July 1, 1966	Cows 2 years and over	50	55	52	53	88
	Yearling heifers	15	14	14	15	30
	Bulls and steers under 1 year (calves)	20	19	20	21	31
	Heifers under 1 year (calves)	19	21	20	19	36
	Bulls over 1 year (yearlings)	3	3	3	3	34
	Steers over 1 year	0	0	0	0	0
Repro. perf.	Percent pregnant ²	94	94	90	88	96
	Calf survival percent ³	98	93	100	95	97
Wean. perf.	ADG ⁴	1.83	1.82	1.92	2.00	1.79
	Av. type sc. ⁵	12.0	11.9	11.2	10.8	12.0
Postweaning performance	No. of bulls	0	0	0	0	25
	No. of heifers	15	14	14	15	22
	No. of steers	17	15	16	20	0
Slaughtered	No. of bulls	0	0	0	0	0
	No. of heifers	0	0	0	0	0
	No. of steers	17	15	16	20	0
Remarks						

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent or percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustments: None

5 - Suggest S-10 scoring system; indicate if different.

^a New project, groups not separated.

Production, Inventory, and Performance Data, S-10 Herds - 1965-1966

State Florida

Location		Raiford	Belle Glade	Brighton		
Breed of sire		Angus	Angus and Brangus	Hereford		
Breed of dam		Grade Angus	A, Bg and A X Bg	Gr. Hereford		
Line or group ¹		Combined ^a	A Bg crisscross ^a	Maternal ability ^a		
Percent used in project		100 ^b	50 ^b	100 ^b		
Inventory as of July 1, 1966	Cows 2 years and over	742	1378	276		
	Yearling heifers	278	402	64		
	Bulls and steers under 1 year	280	490	226		
	Heifers under 1 year	280	490	225		
	Bulls over 1 year	40	70	40		
	Steers over 1 year	0	0	0		
Repro. perf.	Percent pregnant ²	73	73	90		
	Calf survival percent ³	94	91	96		
Wean. perf.	Adj. ADG ⁴	1.54	1.35	1.48		
	Av. type sc. ⁵	9.1	9.9	11.2		
Postweaning performance	No. of bulls	--	--	28		
	No. of heifers	--	--	64		
	No. of steers	--	--	0		
Slaughtered	No. of bulls					
	No. of heifers					
	No. of steers					
Remarks						

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent or percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustments: None

5 - Suggest S-10 scoring system; indicate if different.

^a New projects, groups not separated^b Cattle owned by cooperator

Production, Inventory, and Performance Data, S-10 Herds - 1965-1966

State Florida

Location		Range Cattle Sta.	Range Cattle Sta.	Range Cattle Sta.	Range Cattle Sta.
Breed of sire		SH	S	S	B
Breed of dam		Brahman	3/4 B 1/4 S	1/2 B 1/2 S	1/2 B 1/2 S
Line or group ¹					
Percent used in project		100	100	100	100
Inventory as of July 1, 1965	Cows 2 years and over	30	39	30	30
	Yearling heifers	7	10	7	7
	Bulls and steers under 1 year	10	16	11	13
	Heifers under 1 year	11	15	10	11
	Bulls over 1 year	1	1	1	1
	Steers over 1 year	0	0	0	0
Repro. perf.	Percent pregnant ²	73	79	70	83
	Calf survival percent ³	95	97	90	96
Wean. perf.	ADG ⁴	1.71	1.71	1.78	1.80
	Av. type sc. ⁵	11.0	11.1	12.2	10.9
Postweaning performance	No. of bulls				
	No. of heifers				
	No. of steers				
Slaughtered	No. of bulls				
	No. of heifers				
	No. of steers				
Remarks					

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent or percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustments: None

5 - Suggest S-10 scoring system; indicate if different.

Production, Inventory, and Performance Data, S-10 Herds - 1965-1966

(continued) State Florida

Location		Range Cattle Sta.	Range Cattle Sta.	
Breed of sire		B	B	
Breed of dam		1/4 B 3/4 S	Shorthorn	
Line or group ¹				
Percent used in project		100	100	
Inventory as of July 1, 1965	Cows 2 years and over	35	30	
	Yearling heifers	9	7	
	Bulls and steers under 1 year	12	12	
	Heifers under 1 year	14	11	
	Bulls over 1 year	1	1	
	Steers over 1 year	0	0	
Repro. perf.	Percent pregnant ²	74	77	
	Calf survival percent ³	100	87	
Wean. perf.	ADG ⁴	1.74	1.52	
	Av. type sc. ⁵	10.6	10.6	
Postweaning performance	No. of bulls			
	No. of heifers			
	No. of steers			
Slaughtered	No. of bulls			
	No. of heifers			
	No. of steers			
Remarks				

- 1 - Purebreds, grade, line, sire number, crosses, treatment, etc.
- 2 - Use palpation percent or percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.
- 3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.
- 4 - Indicate adjustments: None
- 5 - Suggest S-10 scoring system; indicate if different.

Production, Inventory, and Performance Data, S-10 Herds - 1965-1966

State Florida

Location		Range Cattle Sta.	Range Cattle Sta.	Range Cattle Sta.	Range Cattle Sta.
Breed of sire		Angus (A)	Brahman (B)	Charolais (C)	A, B
Breed of dam		A	B	C	B, A
Line or group ¹		Purebred	Purebred	Grade	Reciprocal Crossbreds
Percent used in project		100	100	100	100
Inventory as of July 1, 1965	Cows 2 years and over	10	13	10	20
	Yearling heifers				
	Bulls and steers under 1 year	3	4	2	6
	Heifers under 1 year	6	4	5	6
	Bulls over 1 year	1	1	1	a
	Steers over 1 year	0	0	0	0
Repro. perf.	Percent pregnant ²	90	77	100	60
	Calf survival percent ³	100	81	100	100
Wean. perf.	ADG ⁴	1.32	1.82	2.12	1.73
	Av. type sc. ⁵	11.0	10.5	11.0	11.2
Postweaning performance	No. of bulls	0	1	1	0
	No. of heifers	6	4	5	6
	No. of steers	3	3	1	6
Slaughtered	No. of bulls	0	0	0	0
	No. of heifers	0	0	0	0
	No. of steers	3	3	1	6
Remarks					

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent or percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustments: None

S-10-1 5 - Suggest S-10 scoring system; indicate if different.

4-66 a - Combined with straightbreds

(continued)

Production, Inventory, and Performance Data, S-10 Herds - 1965-1966

(continued)

State Florida

Location		Range Cattle Sta.	Range Cattle Sta.	
Breed of sire		A, C	B, C	
Breed of dam		C, A	C, B	
Line or group ¹		Reciprocal Crossbreds	Reciprocal Crossbreds	
Percent used in project		100	100	
Inventory as of July 1, 1965	Cows 2 years and over	22	21	
	Yearling heifers			
	Bulls and steers under 1 year	6	9	
	Heifers under 1 year	8	9	
	Bulls over 1 year	a	a	
	Steers over 1 year	0	0	
Repro. perf.	Percent pregnant ²	68	81	
	Calf survival percent ³	86	100	
Wean. perf.	ADG ⁴	1.70	2.02	
	Av. type sc. ⁵	11.3	11.0	
Postweaning performance	No. of bulls	0	0	
	No. of heifers	8	9	
	No. of steers	6	9	
Slaughtered	No. of bulls	0	0	
	No. of heifers	0	0	
	No. of steers	6	9	
Remarks				

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent or percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustments: None

5 - Suggest S-10 scoring system; indicate if different.

a - Combined with straightbreds

Production, Inventory, and Performance Data, S-10 Herds - 1965-1966

State Florida

Location	Belle Glade	Belle Glade	Belle Glade	Belle Glade
Breed of sire	Angus	Brahman	Hereford	A, B
Breed of dam	Angus	Brahman	Hereford	Crossbred
Line or group ¹	Angus	Brahman	Hereford	AB Crisscross
Percent used in project	75	75	75	75
Inventory as of July 1, 1965	Cows 2 years and over	39	42	38
	Yearling heifers	8	12	10
	Bulls and steers under 1 year	10	7	10
	Heifers under 1 year	20	9	21
	Bulls over 1 year	4	3	4
	Steers over 1 year			
Repro. perf.	Percent pregnant ²	96	62	94
	Calf survival percent ³	93	76	97
Wean. perf.	ADG ⁴	1.25	1.64	1.55
	Av. type sc. ⁵	10.3	9.9	11.3
Postweaning performance	No. of bulls			
	No. of heifers	8	12	10
	No. of steers			
Slaughtered	No. of bulls			
	No. of heifers			
	No. of steers			
Remarks				

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent or percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustments: None

5 - Suggest S-10 scoring system; indicate if different.

Production, Inventory, and Performance Data, S-10 Herds - 1965-1966

(continued)

State Florida

Location		Belle Glade	Belle Glade	
Breed of sire		A, A	B, H	
Breed of dam		Crossbred	Crossbred	
Line or group ¹		AH Crisscross	BH Crisscross	
Percent used in project		75	50	
Inventory as of July 1, 1965	Cows 2 years and over	83	77	
	Yearling heifers	23	24	
	Bulls and steers under 1 year	41	30	
	Heifers under 1 year	28	29	
	Bulls over 1 year			
	Steers over 1 year			
Repro. perf.	Percent pregnant ²	98	93	
	Calf survival percent ³	98	95	
Wean. perf.	ADG ⁴	1.60	1.92	
	Av. type sc. ⁵	11.5	11.3	
Postweaning performance	No. of bulls			
	No. of heifers	23	24	
	No. of steers			
Slaughtered	No. of bulls			
	No. of heifers			
	No. of steers			
Remarks				

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent or percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustments: None

5 - Suggest S-10 scoring system; indicate if different.

BROOKSVILLE BEEF CATTLE RESEARCH STATION
Brooksville, Florida

I. PROJECT: AH dl-5 (revised) State Project 629

Title: Selection of Cattle for Beef Production in Southeastern United States.

II. OBJECTIVES:

To improve the reproductive efficiency and meat producing qualities of different strains of cattle under Florida conditions, to test various breeding systems with these cattle, and to determine if combining ability can be increased with cross-progeny testing.

III. PERSONNEL:

Dr. Marvin Koger, Florida Experiment Station, Gainesville, Florida
W. C. Burns, in Charge, Brooksville Beef Cattle Research Station, Brooksville, Florida
Dr. R. S. Temple, Regional Coordinator (S-10), U. S. Department of Agriculture, Knoxville, Tennessee

Cooperators:

Dr. A. C. Warnick, Florida Experiment Station, Gainesville, Florida
Dr. A. Z. Palmer, Florida Experiment Station, Gainesville, Florida
Dr. J. R. Crockett, Florida Experiment Station, Gainesville, Florida
Dr. H. L. Chapman, Range Cattle Experiment Station, Ona, Florida/ State Experiment Stations cooperating in S-10.

IV. ACCOMPLISHMENTS:

1. Scope and Nature of work

(a) Permanent improvement consisted of erecting a 42' x 60' hay shed and planting 70 acres to permanent pastures.

(b) Research Results:

- (1) The injection of 6,000,000 units of Vitamin A twice yearly to mature cows did not show any beneficial results. The Control group gained more than the treated groups by 10 lbs. during the year, and had a 5% higher conception rate.
- (2) Injectible Vitamin A had no beneficial results on the performance of calves since both the Control and Treated calves had an index of 100.
- (3) The F_1 Brahman x Angus crossbreds had the highest conception rate with 94 percent, followed by the Brooksville Herefords, Line 6, with 88 percent, Angus and Santa Gertrudis, 87 percent, Line 4 and Line 5 Miles City Herefords with 84 percent and the Brahmans lowest with 62 percent.

- (4) The Santa Gertrudis continue to wean the heaviest calf with 528 lbs., followed by the 3/4 Angus-1/4 Brahman calves with 474 lbs.; Line 6 Herefords, 446 lbs.; Angus, 418 lbs.; Line 5 Herefords, 414 lbs.; Line 4 Herefords, 409 lbs.; and Brahman, with 389 lbs.
- (5) In the "Combining Ability" study, two Angus bulls sired considerably better crossbred calves than Angus calves. However, there was not the definite sire x breed interaction that has shown up in previous years. In no case did a bull sire better Angus calves than crossbred calves.

V. FUTURE PLANS:

- (a) Summarize the Vitamin A work at the end of this calf year.
- (b) Run a preliminary analysis on the "Combining Ability" data to determine whether or not to continue this project.

VI. PUBLICATIONS:

None

VII. PUBLICATIONS PLANNED:

1. The comparison of protein and hay on the performance of mature beef cows in a summer program.

I. PROJECT: Ah dl-41 State Project 1186

Title: A Study of Response to Selection and Genetic-Environmental Interaction in Genetically Similar Groups of Hereford Cattle at Two Locations. (Miles City Montana and Brooksville, Florida).

II. OBJECTIVES:

- (1) To determine whether originally genetically similar groups of cattle bred and selected for several generations according to the same criteria in the two markedly different environmental conditions of Miles City, Montana and Brooksville, Florida, become genetically different or remain similar.
- (2) To estimate the importance of genetic-environmental interaction within a British breed of beef cattle.
- (3) To determine the importance of adaptation to a specific location if maximum productivity is to be attained.

III. PERSONNEL:

Project committee composed of the following persons: Representatives of the Florida and Montana Agricultural Experiment Stations as designated by the respective directors; Superintendents of the Miles City and Brooksville stations, plus not more than one additional person from each station; the W-1 and S-10 Regional Coordinators; and the Chief of the Beef Cattle Research Branch, *U. S. Department of Agriculture (Chairman).

IV. ACCOMPLISHMENTS:

- (a) The fourth calf crop has been weaned.
- (b) Performance of the cattle were as follows:

<u>Line</u> * <u>No.</u>	<u>Age at weaning</u>	<u>Slaughter grade</u>	<u>Feeder grade</u>	<u>Weaning weight</u>	<u>Adj. daily gain</u>
4 20	219	8.2	10.3	409	1.66
5 4	209	9.3	11.3	414	1.78
6 28	217	9.9	11.7	446	1.84

Line 4 = Select Miles City
 Line 5 = Control Miles City
 Line 6 = Brooksville

The Blood tissue analysis of Hemoglobin, packed cell volume, inorganic plasma phosphorus, total copper and plasma calcium on the Miles City and Brooksville cattle was discontinued on October 12, 1965. This work is in the process of summarization and will be completed in the near future.

The numbers in Line 4 and 5 are up to what is called for in the project outline and the numbers in Line 6 will be up to what is required in 1967.

V. FUTURE PLANS:

Follow project outline.

VI. PUBLICATIONS:

None

VII. PUBLICATIONS PLANNED:

None

I. PROJECT: 1245

Title: Three versus Twelve Month Breeding Seasons for Beef Cattle.

II. OBJECTIVES:

To compare the reproductive and weaning performance of Brahman and Santa Gertrudis cows bred during three-month and continuous 12-month breeding seasons.

III. PERSONNEL:

A. C. Warnick, Florida Experiment Station, Gainesville, Florida
 M. Koger, Florida Experiment Station, Gainesville, Florida
 W. C. Burns, U. S. Department of Agriculture, Brooksville, Florida

Cooperators:

R. S. Temple, U. S. Department of Agriculture, Knoxville, Tennessee

IV. ACCOMPLISHMENTS:

		% with corpus luteum and pregnant					
		3/10/65	4/9/65	5/4/65	6/15/65		
Age and lactation status	No.	c.l.	c.l.	c.l.	preg.	c.l.	preg.
<u>Brahman</u>							
3 yrs. & older-nonlact.	14	29	72	86	36	93	64
3 yrs. & older-lact.	21	5	53	53	21	71	38
2 yrs. heifers	12	0	42	25	8	75	42
1 yr. heifers	3	--	0	0	--	--	--
<u>Santa Gertrudis</u>							
3 yrs. & older-lact.	39	0	49	54	0	90	49
2 yrs. heifers	6	50	100	83	17	83	50
1 yr. heifers	22	--	23	18	--	32	--

Pregnancy Diagnosis - August 25, 1965
 (Breeding through July 10, 1965, approx).

		<u>Seasonal</u>		<u>Continuous</u>		<u>Total</u>			
Breed	No.	No. Preg.	% Preg.	No. Preg.	% Preg.	No. Preg.	% Preg.	No. Preg.	% Preg.
Brahman	17	9	53	18	78	35	23	66	
Santa Gert.	19	13	68	20	100	39	33	85	
Combined	36	22	61	38	90	74	56	76	

V. FUTURE PLANS:

Increase the numbers to 60 in each breed

VI. PUBLICATIONS:

None

VII. PUBLICATIONS PLANNED:

None

State Florida

Location		Brooks-ville	Brooks-ville	Brooks-ville	Brooks-ville	Brooks-ville
Breed of sire		Angus	Brahman	Hereford	Hereford	Hereford
Breed of dam		Angus	Brahman	Hereford	Hereford	Hereford
Line or group ¹		Purebred	Purebred	Line 6	Line 4	Line 5
Percent used in project		100	100	100	100	100
Inventory as of July 1, 1966	Cows 2 years and over	104	49	45	86	21
	Yearling heifers	29	10	14	5	2
	Bulls and steers under 1 year	39	15	11	28	8
	Heifers under 1 year	37	13	19	27	5
	Bulls over 1 year	37	12	17	19	5
	Steers over 1 year					
Repro. perf.	Percent pregnant ²	87	62	88	84	84
	Calf survival percent ³	92.5	95.2	96.5	74.1	100
Wean. perf.	Adj. ADG ⁴	1.65	1.77	1.84	1.66	1.78
	Av. type sc. ⁵	11.3	10.3	11.7	10.3	11.3
Postweaning performance	No. of bulls	33	10	14	14	2
	No. of heifers	29	10	14	6	2
	No. of steers					
Slaughtered	No. of bulls			15 (a)		
	No. of heifers			15 (a)		
	No. of steers			15 (a)		
Remarks						

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent or percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustments:

5 - Suggest S-10 scoring system; indicate if different.

(a) Purchased animals.

State Florida

Location		Brooks-ville	Brooks-ville	
Breed of sire		Angus	S. Gertrudis	
Breed of dam		1/2B-1/2A	S. Gertrudis	
Line or group ¹		Crossbred	Purebred	
Percent used in project		100	100	
Inventory as of July 1, 1966	Cows 2 years and over	85	66	
	Yearling heifers		13	
	Bulls and steers under 1 year	42	14	
	Heifers under 1 year	36	17	
	Bulls over 1 year		10	
	Steers over 1 year			
Repro. perf.	Percent pregnant ²	94	87	Adjustments:
	Calf survival percent ³	97.3	90.2	I. Sex factor:
Wean. perf.	Adj. ADG ⁴	1.94	2.21	Bull .96
	Av. type sc. ⁵	12.00	10.1	Steer 1.00
Postweaning performance	No. of bulls		7	Heifer 1.08
	No. of heifers	47	13	II. Dam factor:
	No. of steers	26		Age 01 1.23
Slaughtered	No. of bulls		15 (a)	02 1.16
	No. of heifers	47	- 15 (a)	03 1.10
	No. of steers	26	15 (a)	04 1.05
Remarks				05 1.03
				06-10 1.00
				11 1.05

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent or percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustments:

5 - Suggest S-10 scoring system; indicate if different.

(a) Purchased animals.

GEORGIA COASTAL PLAIN EXPERIMENT STATION
Tifton, Georgia

I. PROJECT: State 2-99 (S-10)

Selection of Beef Cattle for Single Items of Importance in Profitable Beef Production

II. OBJECTIVES:

To obtain preliminary information on the relative effectiveness of selecting for a single character.

To observe trends in characters for which no selection is made when selection is for a single character.

III. PERSONNEL:

W. C. McCormick, T. M. Clyburn and B. L. Southwell

IV. ACCOMPLISHMENTS DURING THE YEAR:

Four herds of grade Polled Hereford females, owned and maintained by the Georgia State Prison Farm, Reidsville, are used to study selecting for (1) weaning weight, (2) rate of postweaning gain, (3) weaning score and, (4) average performance. For the latter group, replacements with records nearest average for each trait are selected. Bulls used in all four groups are selected from the Polled Hereford herd at Tifton. Weaning data for the 1965 calf crop are shown in tables 1 and 2.

TABLE 1. Weaning data, Foundation Cows, 1965 Calf Crop

Herd	No. calves weaned	Avg. birth weight	ADG-birth to weaning	Weaning scores	
				Type	Condition
"Average"	12	69.5	1.22	9.2	7.0
"Rate of gain"	14	69.7	1.22	9.5	7.7
"Score"	14	65.0	1.10	8.7	6.9
"Wean weight"	15	64.3	1.24	8.9	7.4

TABLE 2. Weaning Data, Generation 1 Cows, 1965 Calf Crop

	No. calves weaned	Avg. birth weight	ADG-birth to weaning	Weaning scores	
				Type	Condition
"Average"	29	64.2	1.36	9.8	7.7
"Rate of gain"	32	67.4	1.30	9.8	7.8
"Score"	36	59.2	1.13	9.2	7.5
"Wean weight"	34	66.1	1.30	9.2	7.7

V. FUTURE PLANS:

The project will be continued as outlined. Selection of generation 2 females will be completed from the 1965 calf crop.

VI. PUBLICATIONS DURING THE YEAR:

Routine annual reports.

VII. PUBLICATIONS PLANNED:

Production data for foundation cows and growth and carcass data for generation 1 steers have been analyzed. These data will be presented for publication as quickly as possible.

Submitted by: W. C. McCormick

I. PROJECT: Animal Husbandry 209, AHRD d1-3 (S-10)

A Study of Grading, Crisscrossing and Rotational Crossing as Breeding Systems for Commercial Beef Production.

II. OBJECTIVES:

To study the relative value of grading, crisscrossing and rotational crossing as breeding systems for commercial beef production.

To study heterotic effects in crosses between Angus and Polled Hereford breeds, as compared to heterosis in crosses between these breeds and Santa Gertrudis - a breed based partially on a Brahman foundation.

To study the comparative value of the Santa Gertrudis breed with the Angus and Polled Hereford breeds.

III. PERSONNEL:

W. C. McCormick, T. M. Clyburn, R. L. Saffle and B. L. Southwell

IV. ACCOMPLISHMENTS DURING THE YEAR:

Weaning data for the 1965 calf crop raised by generation 1 cows are as shown in table 1.

TABLE 1. Weaning Data, 1965 Calves, Generation 1 Cows

Herd	Breeding System	No. Calves	Average Birth wt.	A.D.G. Birth to Weaning	Average Type Score	Average Condition Score
Gr. A	Grading-up	27	55.6	1.34	10.2	8.0
Gr. PH	Grading-up	35	65.3	1.25	9.6	8.0
Gr. SG	Grading-up	27	68.5	1.29	7.9	7.3
AxPH	Crisscrossing	34	60.8	1.32	9.7	8.2
AxSG	Crisscrossing	26	60.9	1.47	8.9	8.2
PHxSG	Crisscrossing	31	69.5	1.45	8.8	8.3
AxPHxSG	Rotational crossing	44	66.8	1.52	9.4	8.5

Weaning data for the 1965 calf crop raised by generation two animals are as shown in table 2.

TABLE 2. Weaning Data, 1965 Calves, Generation 2 Cows

Herd	Breeding System	No. Calves	Average Birth wt.	A.D.G. Birth to Weaning	Average Type Score	Average Condition Score
Gr. A	Grading-up	1	68.0	.95	7.2	5.8
Gr. PH	Grading-up	3	64.7	1.11	9.3	7.3
Gr. SG	Grading-up	3	55.3	1.17	7.9	6.8
AxPH	Crisscrossing	3	60.0	1.45	9.4	8.0
AxSG	Crisscrossing	3	66.0	1.58	8.1	7.7
PHxSG	Crisscrossing	4	60.0	1.40	8.6	8.6
AxPHxSG	Rotational crossing	4	63.5	1.62	10.2	9.4

Sixty generation 2 steer calves selected from the 1964 calf crop were grazed and managed as a group until slaughtered in August, 1965. The data for these herds are shown in Table 3.

TABLE 3. Growth and Carcass Data - Generation 2 Steers

Herd	Live Animal Evaluation					
	No. Steers	Initial Wt.	Final Wt.	Daily Gain	Wt./day of Age	Slaughter Grade
A	8	397	809	1.40	1.39	8.5
H	8	348	821	1.62	1.44	8.6
SG	8	474	950	1.63	1.70	8.1
AxH	8	396	835	1.48	1.47	8.5
AxSG	8	499	979	1.64	1.70	9.5
HxSG	8	453	924	1.61	1.58	8.6
AxHxSG	12	472	979	1.74	1.70	8.7

Herd	Carcass Evaluation						
	Hot Wt.	Dressing Percent	Length	Grade	Rib eye/ Cwt.	Rib eye Fat in.	Wt./day of Age
A	459	56.9	45.19	8.8	1.88	.48	.79
H	465	56.6	46.00	7.6	1.83	.41	.82
SG	551	58.0	48.63	7.8	1.56	.39	1.12
AxH	480	57.5	46.16	8.1	1.80	.50	.84
AxSG	569	58.1	48.25	8.6	1.55	.53	.99
HxSG	533	57.6	47.72	8.0	1.68	.41	.91
AxHxSG	574	58.6	48.31	8.3	1.69	.48	1.00

V. FUTURE PLANS:

The studies will be continued as planned.

VI. PUBLICATIONS DURING THE YEAR:

Routine annual reports.

VII. PUBLICATIONS PLANNED:

Journal papers on production information for foundation cows and growth data for generation 1 animals.

Submitted by: W. C. McCormick

I. PROJECT: Animal Husbandry 224, AHRD d1-3 (S-10)

Improvement of Performance and Carcass Quality in Beef Cattle Through Selection.

II. OBJECTIVES:

To develop herds of Polled Hereford and Angus cattle with superior performance.

To progeny test Polled Hereford and Angus sires with selection criteria based primarily on pre-and postweaning growth rate, and carcass meatiness and tenderness.

III. PERSONNEL:

W. C. McCormick, R. L. Saffle and B. L. Southwell

IV. ACCOMPLISHMENTS DURING THE YEAR:

The Polled Hereford herd of around 105 females was mated to five sires. Progeny tested sires 47, 853 and 111B were bred to cows designated as superior and to tester cows. Performance tested bulls 1011 and 195 were mated to tester cows. The Angus cows were bred artificially to 934, an American Breeders Service sire and to 427, a sire owned by Wye Plantation and naturally to 450, a son of 934.

The calves were born January to March. All bull calves were creep-fed. All calves were weaned September 7, 1965. The bulls were placed on feed immediately for 168 days. Both the Angus and Polled Hereford bulls were fed by sire groups. At weaning, prospective breeding heifers were separated and placed on pasture. Restricted grain feeding was practiced until small grain pasture was ready to graze. Thereafter, grain feeding was discontinued. At the end of the feeding period, calves sired by Angus sire 427 and Polled Hereford sires 1011 and 195 were slaughtered to obtain carcass data as shown in table 2.

TABLE 1. Growth and Feedlot Data

Breed	Sire	No. Bull Calves	Weaned Weight	Feedlot Daily Gain	Final Age	Wt./day of Age	Type Score
PH	47	11	489	2.93	390	2.52	12.4
PH	853	7	523	2.70	395	2.47	12.4
PH	111B	8	478	2.55	396	2.29	11.1
PH	1011	7	456	2.64	390	2.31	11.9
PH	195	5	481	2.92	397	2.45	12.9
A	934	7	496	2.62	392	2.38	12.4
A	450	5	408	2.52	365	2.28	11.9
A	427	7	435	2.40	382	2.19	11.6

TABLE 2. Carcass Data

Breed	Sire	No. Killed	Dressing Percent	Avg. Rib Eye Fat Thickness	Average Rib Eye Area/ Cwt. Carcass	Carcass Wt./day of Age	Carcass Length
PH	195	8	57.1	.45	2.33	1.16	43.8
PH	1011	8	57.6	.50	2.25	1.08	42.9
A	427	5	58.9	.46	2.40	1.13	42.7

V. FUTURE PLANS:

Continue Project as outlined.

VI. PUBLICATIONS DURING THE YEAR:

Routine annual reports.

VII. PUBLICATIONS PLANNED:

None

Submitted by: W. C. McCormick

Production, Inventory, and Performance Data, S-10 Herds - 1965-1966

State Georgia

Location		Tifton	Tifton	Reids-ville	Reids-ville	Reids-ville
Breed of sire		PH	A	A	PH	SG
Breed of dam		PH	A	Gr. A	Gr. PH	Gr. SG
Line or group ¹		Purebred	Purebred	Grade	Grade	Grade
Percent used in project		80	80	100	100	100
Inventory as of July 1, 1966	Cows 2 years and over	86	36	40	47	43
	Yearling heifers	18	16	11	20	14
	Bulls and steers under 1 year	40	13	13	15	15
	Heifers under 1 year	40	16	17	20	7
	Bulls over 1 year	8	3	4	4	4
	Steers over 1 year	0	0	8	8	8
Repro. perf.	Percent pregnant ²	91	79	84	92	84
	Calf survival percent ³	93	91	89	100	93
Wean. perf.	Adj. ADG ⁴	1.81*	1.80*	1.34	1.25	1.29
	Av. type sc. ⁵	11.4	11.6	10.2	9.6	7.9
Postweaning performance	No. of bulls	38	19	0	0	0
	No. of heifers	39	20	0	0	0
	No. of steers	0	0	8	8	8
Slaughtered	No. of bulls	7	0	0	0	0
	No. of heifers	10	0	0	0	0
	No. of steers	0	0	8	8	8
Remarks						

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent or percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustments: *Sex (to steer basis) and age of dam.

5 - Suggest S-10 scoring system; indicate if different.

Production, Inventory, and Performance Data, S-10 Herds - 1965-1966

State Georgia

Location		Reids-ville	Reids-ville	Reids-ville	Reids-ville	
Breed of sire		A, PH	A, SG	PH, SG	A, PH, SG	
Breed of dam		A x PH	A x SG	PH x SG	A x PH x SG	
Line or group ¹		Criss-Cross	Criss-Cross	Criss-Cross	Rotational Cross	
Percent used in project		100	100	100	100	
Inventory as of July 1, 1966	Cows 2 years and over	54	40	44	55	
	Yearling heifers	16	16	16	20	
	Bulls and steers under 1 year	20	11	14	25	
	Heifers under 1 year	18	18	17	18	
	Bulls over 1 year	**	**	**	**	
	Steers over 1 year	8	8	8	12	
Repro. perf.	Percent pregnant ²	94	84	91	92	
	Calf survival percent ³	88	96	88	95	
Wean. perf.	Adj. ADG ⁴	1.32	1.48	1.48	1.52	
	Av. type sc. ⁵	9.7	8.9	8.8	9.4	
Postweaning performance	No. of bulls	0	0	0	0	
	No. of heifers	0	0	0	0	
	No. of steers	8	8	8	12	
Slaughtered	No. of bulls	0	0	0	0	
	No. of heifers	0	0	0	0	
	No. of steers	8	8	8	12	
Remarks						

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent or percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustments:

5 - Suggest S-10 scoring system; indicate if different

** Same bulls used in three grade groups

Production, Inventory, and Performance Data, S-10 Herds - 1965-1966

State Georgia

Location	Reids-ville	Reids-ville	Reids-ville	Reids-ville	
Breed of sire	PH	PH	PH	PH	
Breed of dam	Gr. PH	Gr. PH	Gr. PH	Gr. PH	
Line or group ¹	Wean wt.	Rate of gain	Type	Average	
Percent used in project	100	100	100	100	
Inventory as of July 1, 1966	Cows 2 years and over	61	43	60	54
	Yearling heifers	15	10	16	21
	Bulls and steers under 1 year	19	19	20	15
	Heifers under 1 year	26	17	20	26
	Bulls over 1 year	2	2	2	2
	Steers over 1 year	0	0	0	0
Repro. perf.	Percent pregnant ²	90	82	95	79
	Calf survival percent ³	97	100	97	88
Wean. perf.	Adj. ADG ⁴	1.30	1.30	1.13	1.36
	Av. type sc. ⁵	9.2	9.8	9.2	9.8
Postweaning performance	No. of bulls	0	0	0	0
	No. of heifers	15	10	16	21
	No. of steers	0	0	0	0
Slaughtered	No. of bulls	0	0	0	0
	No. of heifers	0	0	0	0
	No. of steers	0	0	0	0
Remarks					

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent or percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustments:

5 - Suggest S-10 scoring system; indicate if different.

UNIVERSITY OF KENTUCKY
Agriculture Experiment Station
Lexington, Kentucky

I. PROJECT: Animal Science 260 (S-10)

Measurement and Selection of Economically Important Traits in Beef Cattle

II. OBJECTIVES:

To use rate of gain, efficiency of gain, conformation and carcass characteristics in an overall selection experiment.

III. PERSONNEL:

N. W. Bradley, L. V. Cundiff, D. G. Steele, W. P. Garrigus, and J. D. Kemp

IV. ACCOMPLISHMENTS DURING THE YEAR:

The herd of Hereford cattle being used by the University in this project has included 599 head of varying ages and sexes. Of these 372 are station owned and 227 are cooperator owned. The 227 cooperator owned cows were bred to 8 two- and three- year-old bulls in January, February, and March of 1966 for the purpose of obtaining progeny test data. During the first 3 months of 1966 128 calves were born. At present 195 cows are being bred to calve in January, February, and March of 1967.

During the year pre- and postweaning performance tests were conducted on 37 bull calves and 43 heifer calves born in the spring of 1965. The results of these tests are summarized according to sire in Table 1 and Table 2 for bulls and heifers, respectively.

Also during the year of 1965 progeny tests were completed on 4 sires. The results of this test are summarized in Tables 3 and 4.

TABLE 1. PREWEANING AND POSTWEANING PERFORMANCE OF BULLS ON TEST IN 1965

Item	Sire						
	181 H	HP 15	PZ-8	A41	C-30	E-2	Z-6
<u>Preweaning</u>							
Number	10	10	5	4	3	3	2
Age in days	228	236	251	220	177	197	246
Weaning wt., lb.	415	402	439	411	365	385	435
ADG, lb.	1.50	1.42	1.47	1.66	1.66	1.60	1.50
Adj. ADG, lb.	1.52	1.45	1.50	1.61	1.64	1.47	1.45
Type ¹	11.2	11.7	11.8	12.8	12.3	12.0	10.5
Index ²	98.4	98.2	100	109.5	108.7	100.3	92.0
<u>Postweaning</u>							
Number	10	10	4	4	3	3	2
Age in days	419	425	437	399	353	377	430
Final wt., lb.	795	733	741	801	796	728	826
ADG, lb.	2.40	2.14	1.86	2.46	2.71	2.23	2.38
Wt./day of age, lb.	1.89	1.73	1.70	2.06	2.27	1.96	1.92
Type ¹	11.5	11.4	11.1	12.0	11.4	12.0	9.9

(continued)

TABLE 1. (continued)

Item	Sire						
	181 H	HP 15	PZ-8	A41	C-30	E-2	Z-6
<u>Postweaning</u>							
Index ³	127.0	117.1	113.1	133.0	138.8	125.9	122.1
Feed/cwt. gain ⁴	661	760	608	630	593	608	-----

1 11 = high good, 12 = low choice, 13 = average choice.

2 Preweaning index = (40 x Adj. ADG) - 18 + 5 (Type score).

3 Postweaning index = $\frac{\overline{(20 \times \text{ADG}) + 20 \times (\text{WDA})}}{\overline{}} - 18 + 5$ (Type score).

4 Obtained for 5 bulls by 181 H, 4 bulls by HP 15, 2 bulls by PZ 8, 2 bulls by A41, 3 bulls by C-30 and 2 bulls by E-2.

TABLE 2. PREWEANING AND POSTWEANING PERFORMANCE OF HEIFERS ON TEST IN 1965

Item	Sires						
	181 H	HP 15	PZ-8	A 41	C-30	E-2	Z-6
<u>Preweaning</u>							
Number	9	11	10	4	4	2	3
Age in days	251	248	250	245	206	193	253
Weaning wt., lbs.	398	391	397	372	347	396	403
ADG, lb.	1.35	1.32	1.31	1.30	1.38	1.69	1.37
Adj. ADG, lb.	1.54	1.53	1.51	1.43	1.56	1.82	1.56
Type ¹	11.9	11.5	12.0	12.0	12.2	12.5	12.3
Index ²	102.4	100.5	101.7	99.0	105.5	116.5	105.7
<u>Postweaning</u>							
Number	9	11	10	4	4	2	3
Age in days	414	411	413	403	348	346	416
Final wt., lb.	582	555	572	552	509	575	607
ADG, lb.	1.20	1.10	1.12	1.22	1.23	1.41	1.30
Wt./day of age, lb.	1.40	1.35	1.38	1.38	1.47	1.66	1.46
Type ¹	12.2	11.7	11.4	11.9	11.8	12.5	12.4
Index ³	95.3	89.1	89.8	93.2	95.0	105.9	99.0

1 11 = high good, 12 = low choice, 13 = average choice.

2 Preweaning Index = (40 x Adj. ADG) - 18 + 5 (Type score).

3 Postweaning Index = $\frac{\overline{(20 \times \text{ADG}) + (20 \times \text{WDA})}}{\overline{}} - 18 + 5$ (Type score).

TABLE 3. RESULTS OF 1964-65 PROGENY TEST (PERFORMANCE DATA)

Item	Sire							
	181 H		P-Z8		Zato 19		Zato 16	
	Steers Hfrs.		Steers Hfrs.		Steers Hfrs.		Steers Hfrs.	
Number	8	2	5	3	8	2	5	1
<u>Prewaning</u>								
Weaning wt., lbs.	595	478	589	443	631	448	570	475
ADG, lb.	1.83	1.71	1.91	1.55	1.85	1.28	1.66	1.46
Adj. ADG, lb.	2.04	1.97	2.09	1.80	1.97	1.45	1.76	1.65
Type	12.1	12.0	12.6	12.0	12.5	11.5	12.6	14.0
Index	123.8	120.5	128.6	114.0	122.9	97.0	115.4	117.0
<u>Postweaning</u>								
Age in days	505	460	489	465	512	517	518	498
Final wt., lb.	954	757	900	681	1007	788	910	674
ADG, lb.	2.17	1.72	1.84	1.31	2.07	1.76	1.90	1.33
Wt./day of age, lb	1.88	1.65	1.84	1.47	1.97	1.52	1.75	1.35
Type	12.1	12.7	11.1	11.1	11.6	11.4	11.7	12.3
Index	123.4	112.7	108.8	93.1	121.5	104.7	113.8	97.1

TABLE 4. RESULTS OF 1964-65 PROGENY TEST (CARCASS DATA)

Item	Sire							
	181 H		PZ-8		Zato 19		Zato 16	
	Steers	Hfrs.	Steers	Hfrs.	Steers	Hfrs.	Steers	Hfrs.
Number	8	2	5	3	8	2	5	1
Age at slaughter	513	469	497	485	526	526	537	507
Wt. at slaughter, lb.	939	747	881	675	999	780	896	665
Cold carcass wt., lb.	565	444	536	402	608	465	544	386
Dressing percent	60.0	59.4	60.7	59.7	60.8	59.6	60.6	58.0
Hide wt.	91	64	83	64	87	70	85	62
Conformation ¹	13.1	12.0	12.8	11.3	13.6	11.5	13.2	12.0
Marbling score ²	3.8	4.5	3.2	4.0	3.5	4.5	4.4	4.0
Rib-eye area sq. in.	11.8	9.5	11.9	9.7	11.4	10.2	12.0	9.0
Fat-thickness, in.	.4	.4	.4	.4	.5	.5	.4	.5
Kidney fat, %	1.1	1.8	1.0	1.5	1.6	2.0	1.5	1.5
Est. % boneless retain cuts	52.5	51.2	52.6	52.0	51.1	51.4	52.8	50.1
Yield grade	2.2	2.8	2.2	2.5	2.9	2.8	2.1	2.8
Carcass grade	9.9	11.0	9.2	9.7	9.6	12.5	10.8	11.0
Color of fat	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Color of lean	4.1	4.5	4.4	5.3	4.0	4.0	4.8	7.0
9-10-11th rib separation								
% fat	29.9	38.6	30.8	33.0	32.7	40.8	30.3	37.5
% lean	55.1	48.5	53.4	50.9	52.0	46.1	54.2	47.3
% bone	14.2	12.3	15.2	15.1	14.4	12.2	15.0	13.6
Taste panel								
Flavor	7.7	7.8	7.7	7.8	7.7	7.6	7.9	7.5
Juiciness	7.2	7.8	7.2	7.4	7.1	7.4	7.8	7.5
Tenderness	7.5	7.7	7.5	7.6	7.4	7.5	7.8	8.1
Overall satisfaction	7.5	7.7	7.6	7.6	7.5	7.5	7.8	7.9

V. FUTURE PLANS:

Future plans are to proceed according to the project outline as rapidly as time and facilities permit. The foundation herd of 200 cows will be maintained for one more year and then the control herd will be established.

VI. PUBLICATIONS DURING THE YEAR

Bradley, N. W., J. Ralph Overfield, J. D. Kemp and J. T. Thompson. 1965 Measurement and Selection of Economically Important Traits in Beef Cattle. Kentucky Animal Science Research Reports. University of Kentucky Agr. Exp. Sta. Prog. Report 150.

Cundiff, L. V., N. W. Bradley, J. D. Kemp and T. R. Greathouse. 1966. Performance and Carcass Characteristics of Hereford and Hereford X Red Poll Steers and Heifers. J. Animal Sci. 25:265 (abstr.).

VII. PUBLICATIONS PLANNED:

Bradley, N. W., L. V. Cundiff, J. D. Kemp and T. R. Greathouse. 1966. Effect of Sex and Sire on Performance and Carcass Traits of Hereford and Hereford - Red Poll Calves. J. Animal Sci. 25: (in press).

Submitted by N. W. Bradley

Production, Inventory, and Performance Data, S-10 Herds - 1965-1966

State Kentucky

Location		Cold-stream	Mercer	Princeton	Walnut Hall Stud	
Breed of sire		Hereford	Hereford	Hereford	Hereford	
Breed of dam		Hereford	Hereford	Hereford	Hereford	
Line or group ¹		Station	Station	Station	Coop	
Percent used in project		100	100	100	100	
Inventory as of July 1, 1966	Cows 2 years and over	0	27	149	155	
	Yearling heifers	12	0	19	72	
	Bulls and steers under 1 year	0		77	0	
	Heifers under 1 year	0		51	0	
	Bulls over 1 year	23	1	6	0	
	Steers over 1 year	0	0	0	0	
Repro. perf.	Percent pregnant ²	-	46.5	74.7	a	
	Calf survival percent ³	-	50.0	93.6	a	
Wean. perf.	Adj. ADG ⁴	-	1.72	1.52	-	
	Av. type sc. ⁵	-	12.9	11.6	-	
Postweaning performance	No. of bulls	44 ^b	-	-	-	
	No. of heifers	46 ^b (8 ^c)	-	-	-	
	No. of steers	26 ^c	-	-	-	
Slaughtered	No. of bulls	30 ^b (8 ^c)	-	-	-	
	No. of heifers	15 ^b	-	-	-	
	No. of steers	26 ^c	-	-	-	
Remarks						

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent or percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustments:

5 - Suggest S-10 scoring system; indicate if different.

a Cows bred to 8 bulls Jan-Mar of 1966 for progeny testing

b 1965 calves

c 1964 calves progeny tested

LOUISIANA STATE UNIVERSITY
Agriclutural Experiment Station
Baton Rouge, Louisiana

I. PROJECT: 605 (S-10)

Comparison of Various Crossbred Cattle Under Gulf Coast Conditions with Respect to Rate of Growth on Pasture, Fattening Ability, and Meat Quality of Steers.

II. OBJECTIVES:

To study types and breeds of beef cattle to determine which are best suited to Gulf Coast conditions, with respect to rate of growth, fattening ability, and meat quality.

To study various crossbreeding programs as to practicality, production, and usefulness.

To study the amount of hybrid vigor obtained through crossing beef breeds and to ascertain how much of this hybrid vigor is maintained through subsequent backcrossing, multiple-breed crossing, and rotational crossing.

To study the productive ability of dams of various breeds and breed crosses.

To estimate genetic parameters.

To study practical problems of management and marketing of crossbred cattle in the Gulf Coast area.

III. PERSONNEL:

J. W. Turner, A. M. Mullins, R. F. Boulware, Ted O. McRae, G. L. Robertson and Dorothy Wilson.

IV. ACCOMPLISHMENTS DURING THE YEAR:

The 1965 calf crop was the thirteenth group produced on the project and the fifth group under the latest revision of comparing contemporary straightbred, single cross, backcross and three-breed cross calves. Summary statistics on preweaning performance for all 1965 calves and postweaning performance on the steer calves are presented by mating-type and breed-of-sire classifications in tables 1, 2, 3 and 4.

A study of reproductive performance among straightbred and single cross crossbred cows was made using data collected over the 13-year period of the project. Measures of heterosis for percentage of calves born and percentage of calves weaned were computed, where the data were applicable. Measures of average 205-day adjusted weaning weight and pounds of calf produced per cow exposed to breeding were also computed. Results of this study are summarized in tables 5, 6, 7 and 8. This study revealed the relative importance of calf crop percentage in determining the actual pounds of calf produced per cow exposed to breeding. On a breed-type classification, the cows weaning the heaviest calves were not the most productive due to initial differences in reproductive efficiency.

Table 1

1965 Summary of Calf Performance by Mating-Type Classification

Group	Number of Calves	205-Day Adj. Wng. Weight ^a	Feeder Grade
Straightbreds	19	389.4	10.2
Single crosses	37	427.4	10.4
Backcrosses	44	458.7	11.0
3-Breed crosses	69	461.0	11.1
Rotational crosses (3 breed)	8	448.9	10.8
Total	177	445.2	10.8

^a 205-day weight is adjusted to be equivalent to a bull calf produced by a four year old or older dam. Additive correction factors are:

<u>Age of dam</u>	<u>Factor</u>	<u>Sex of Calf</u>	<u>Factor</u>
3	+30	Bull	0
4	+10	Steer	+30
5 or older	0	Heifer	+46

Table 2

1965 Summary of Calf Performance by Breed of Sire

Breed of Sire	Number of Calves	205-Day Adj. Wng. Weight	Feeder Grade
Angus	35	438.3	11.06
Brahman	30	442.8	10.60
Brangus	28	418.7	10.31
Charolais	33	503.3	11.43
Hereford	38	433.9	10.75
Shorthorn	13	411.9	10.61

Table 3

1965 Summary of Postweaning Performance by Mating-Type Classification

Group	Number of Steers	168-Day ADG	ATWT ^a	Carcass Grade
Straightbreds	13	1.80	563.9	10.0
Single crosses	14	1.80	589.9	10.1
Backcrosses	20	1.75	620.1	9.8
3-Breed crosses	36	1.69	625.5	10.3
Rotational crosses (3 breed)	6	1.94	625.6	10.4
Total	89	1.76	609.7	10.1

^a ATWT - Average test weight, an average of liveweight measures taken at 28-day intervals.

Table 4

1965 Summary of Postweaning Performance by Breed of Sire

Breed of Sire	Number of Steers	168-Day ADG	ATWT	Carcass Grade
Angus	19	1.88	635.9	11.5
Brahman	12	1.63	590.8	8.3
Brangus	19	1.77	591.9	10.4
Charolais	18	1.64	637.9	8.7
Hereford	21	1.80	589.1	10.8

Table 5

Comparison of Straightbred and Crossbred Reproductive Performance

Classification	Number Cows Exposed	Number Calves Born	% Calves Born	Number Calves Weaned	% Calves Weaned
Straightbred	1711	1123	65.6	1035	60.5
Crossbred	1372	1011	73.7	937	68.3
Total	3083	2134	69.2	1772	64.0

Table 6

Average Calving Percentage by Breed of Dam Classification

Breed	Number Cows Bred	Number Calves Born	% Calves Born	Number Calves Weaned	% Calves Weaned
Angus	444	278	62.6	252	56.8
Brahman	428	289	67.5	265	61.9
Brangus	422	291	69.0	272	64.5
Hereford	417	265	63.5	246	59.0
A-B	82	63	76.8	59	72.0
A-BA	101	60	59.4	59	58.4
A-H	89	57	64.0	53	59.6
B-A	73	58	79.5	45	61.6
B-BA	112	93	83.0	85	75.9
B-H	81	70	86.4	67	82.7
BA-A	57	35	61.4	32	56.1
BA-B	53	30	56.6	27	50.9
BA-H	69	51	73.9	47	68.1
C-A	55	41	74.5	38	69.1
C-B	60	45	75.0	39	65.0
C-BA	55	39	70.9	38	69.1
C-H	49	37	75.5	34	69.4
H-A	81	55	67.9	54	66.7
H-B	92	81	88.0	77	83.7
H-BA	100	74	74.0	68	68.0
S-A	41	28	68.3	26	63.4
S-B	42	33	78.6	33	78.6
S-BA	38	27	71.2	26	68.4
S-H	<u>42</u>	<u>34</u>	<u>81.0</u>	<u>30</u>	<u>71.4</u>
	3,083	2,134	69.2	1,972	64.0

^a Breeds are coded as: A = Angus, B = Brahman, BA = Brangus, C = Charolais, H = Hereford and S = Shorthorn. The crossbred cow breed type shows the breed of sire mated to the breed of dam, i.e., A-B = Angus-Brahman crossbred cows produced by mating an Angus bull to a Brahman cow.

Table 7

Weaning Weight Production Measures by Breed of Dam Classification

Breed	Number Cows Bred	Number Calves Weaned	Average Weaning Weight	Lb. Calf Weaned per Cow in Herd
Angus	444	252	390.1	221.4
Brahman	428	265	430.9	266.8
Brangus	422	272	439.6	283.3
Hereford	417	246	385.7	227.6
A-B	82	59	463.2	333.3
A-BA	101	59	423.2	247.2
A-H	89	53	406.5	242.1
B-A	73	45	451.3	278.2
B-BA	112	85	448.9	340.7
B-H	81	67	462.7	382.7
BA-A	57	32	422.0	236.9
BA-B	53	27	467.3	238.0
BA-H	69	47	453.8	309.1
C-A	55	38	453.2	313.1
C-B	60	39	510.6	331.9
C-BA	55	38	486.0	335.8
C-H	49	34	478.6	332.0
H-A	81	54	410.1	273.4
H-B	92	77	485.3	406.2
H-BA	100	68	439.7	299.0
S-A	41	26	356.3	225.9
S-B	42	33	450.1	353.6
S-BA	38	26	415.5	284.3
S-H	42	30	385.7	275.5
	3,083	1,972	428.8	274.2

Table 8

Heterosis in Percentage Calf Crop

Classification	% Born	Parental Average	% Heterosis	% Weaned	Parental Average	% Heterosis
Angus X Brahman	78.1	65.0	20.2	67.1	59.4	13.0
Angus X Brangus	60.1	65.8	--	57.6	60.6	--
Angus X Hereford	65.9	63.0	4.6	62.9	57.9	8.6
Brahman X Brangus	74.5	68.2	9.2	67.9	63.2	7.4
Brahman X Hereford	87.3	65.5	33.3	83.2	60.4	37.7
Brangus X Hereford	74.0	66.2	11.8	68.0	61.8	10.0

V. FUTURE PLANS:

The project will be continued. However, it is anticipated that a project revision will be put into effect shortly with emphasis directed toward testing and evaluating specific rotational crossbreeding schemes.

VI. PUBLICATIONS DURING THE YEAR:

Franke, Donald E. 1965. The effectiveness of selection of crossbred versus straightbred beef heifers. M. S. Thesis. Louisiana State University, Baton Rouge, Louisiana.

Franke, D. E., J. C. Glenn, N. C. England and C. Phillips. 1965. Estrual behavior and percent pregnancy in crossbred beef cows treated with chlormadinone acetate. J. Animal Sci. 24:289 (Abstr.).

VII. PUBLICATIONS PLANNED:

Reproductive performance of straightbred and crossbred beef cows in Louisiana.

Submitted by: J. W. Turner

Production, Inventory, and Performance Data, S-10 Herds - 1965-1966

State Louisiana

Location	Baton Rouge	Baton Rouge	Baton Rouge	Baton Rouge	Baton Rouge
Breed of sire	Angus	Angus	Brahman	Brahman	Brangus
Breed of dam	Angus	(a)	Brahman	(a)	Brangus
Line or group ¹	Straight-bred	(b)	Straight-bred	(b)	Straight-bred
Percent used in project	100	100	100	100	100
Inventory as of July 1, 1966	Cows 2 years and over	9	72	12	53
	Yearling heifers	1	4	1	9
	Bulls and steers under 1 year	1	20	2	11
	Heifers under 1 year	4	21	1	13
	Bulls over 1 year	4	0	4	0
	Steers over 1 year	0	0	0	0
Repro. perf.	Percent pregnant ²	33.3	72.7	41.7	71.4
	Calf survival percent ³	100.0	100.0	100.0	96.7
Wean. perf.	Adj. ADG ⁴	1.45	1.73	1.65	1.72
	Av. type sc. ⁵	10.8	11.1	10.0	10.7
Postweaning performance	No. of bulls				
	No. of heifers		8		7
	No. of steers	3	16	3	9
Slaughtered	No. of bulls				
	No. of heifers		8		7
	No. of steers	3	16	3	9
Remarks					

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent or percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustments:

5 - Suggest S-10 scoring system; indicate if different.

Production, Inventory, and Performance Data, S-10 Herds - 1965-1966

State Louisiana

Location		Baton Rouge	Baton Rouge	Baton Rouge	Baton Rouge	Baton Rouge
Breed of sire		Brangus	Charolais	Charolais	Charolais	Charolais
Breed of dam		(a)	Charolais	Charolais crosses	Charolais crosses	(a)
Line or group ¹		(b)	Straight-bred	Single crosses	Backcross	(b)
Percent used in project		100	100	100	100	100
Inventory as of July 1, 1966	Cows 2 years and over	43	2	28	61	47
	Yearling heifers	0	1	3	23	1
	Bulls and steers under 1 year	13	1	4	19	5
	Heifers under 1 year	9	0	3	23	4
	Bulls over 1 year	0	3	0	1	0
	Steers over 1 year	0	0	0	0	0
Repro. perf.	Percent pregnant ²	69.2	100	93.3	62.2	63.6
	Calf survival percent ³	96.3	100	100.0	92.9	95.2
Wean. perf.	Adj. ADG ⁴	1.65	1.96	2.06	1.85	1.91
	Av. type sc. ⁵	10.4	11.0	11.7	11.2	11.2
Postweaning performance	No. of bulls				9	
	No. of heifers	8				
	No. of steers	16		1	7	10
Slaughtered	No. of bulls				9	
	No. of heifers	8				
	No. of steers	16		1	7	10
Remarks						

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent or percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustments:

5 - Suggest S-10 scoring system; indicate if different.

Production, Inventory, and Performance Data, S-10 Herds - 1965-1966

State Louisiana

Location		Baton Rouge	Baton Rouge	Baton Rouge	Baton Rouge	
Breed of sire		Hereford	Hereford	Angus	Shorthorn	
Breed of dam		Hereford	(a)	(c)	(a)	
Line or group ¹		Straight-bred	(b)		(b)	
Percent used in project		100	100	100	100	Total No. Animals
Inventory as of July 1, 1966	Cows 2 years and over	17	52	0	0	408
	Yearling heifers	3	9	0	0	55
	Bulls and steers under 1 year	3	19	0	0	102
	Heifers under 1 year	3	17	0	0	100
	Bulls over 1 year	4	0	0	0	19
	Steers over 1 year	0	0	0	0	0
Repro. perf.	Percent pregnant ²	57.1	69.6	42.6	70.0	
	Calf survival percent ³	87.5	93.8	85.0	92.9	
Wean. perf.	Adj. ADG ⁴	1.38	1.75	1.55	1.58	
	Av. type sc. ⁵	10.3	10.9	9.8	10.6	
Postweaning performance	No. of bulls					
	No. of heifers		4			
	No. of steers	4	17			
Slaughtered	No. of bulls					
	No. of heifers		4			
	No. of steers	4	17			
Remarks						

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent or percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustments:

5 - Suggest S-10 scoring system; indicate if different.

EXPLANATORY NOTES

for

PRODUCTION, INVENTORY, AND PERFORMANCE DATA SHEETS
FORM I

Louisiana Project 605 (S-10)

- (a) Dams: Straightbreds - Angus, Brahman, Brangus and Hereford
Single crosses - A-B, A-BA, A-H; B-A, B-BA, B-H; BA-A,
BA-B, BA-H; C-A, C-B, C-BA, C-H; H-A,
H-B, H-BA.
- (b) Straightbreds and single crosses
- (c) Two-year-old heifers (straightbreds, single crosses, backcrosses
and three-breed crosses) artificially bred.

IBERIA LIVESTOCK EXPERIMENT STATION
Jeanerette, Louisiana

I. PROJECT: AHRD Line Project dl-6 (revised 1964)

Selection for Changes in Leanness in Beef Cattle and a Study of the Response to Selection for Adaptability in the Gulf Coast Area

II. OBJECTIVES:

To determine whether changes in leanness of Angus and Brangus cattle can be made by selection in opposite directions for fatness.

To estimate genetic and environmental relationships of fatness and leanness with other carcass and production traits.

To determine whether more rapid adaptation and performance of beef (Angus) cattle to the Gulf Coast area can be made by selection of the best available replacements from outside the area.

III. PERSONNEL:

T. M. DeRouen, D. C. Meyerhoeffer, W. L. Reynolds, Noah England, A. M. Mullins, R. F. Boulware, R. S. Temple, and E. J. Warwick.

IV. ACCOMPLISHMENTS DURING THE YEAR:

1. Scope of Work:

The new experiments have been initiated and data have been collected on the aspects of the fat project and the adaptability study.

2. Research Results:

a. Breeding Season and Conception:

The breeding season began on April 15 and lasted for 75 days. A total of 221 cows were sorted into 16 single sire herds. Two other herds were bred artificially.

All cows exposed to bulls during the breeding season were palpated for pregnancy during late August and early September. Conception rates are shown on the schedule for Production, Inventory and Performance.

b. Calving and Weaning Performance:

Mortality of calves during the first 72 hours following parturition was three percent. Weather conditions during the calving season were unusually good and greatly contributed to this small death loss.

The summary of the weaning performance is shown on the schedule of Production, Inventory and Performance Data.

None of the calves were creep fed.

c. Post-Weaning Performance:

Bulls:

Bull calves were weaned when each one reached 180 days of age and were immediately placed on feed test to evaluate performance and to measure fat thickness over the thirteenth rib at 800 pounds. Bulls were full-fed in dry lot. The ration was composed of 75 percent concentrates and 25 percent roughage.

The summary of the performance of the bulls is presented in table 1.

Table 1

Post-Weaning Performance of Bulls -- Fed in 1964-65

Breed	Brangus	Angus (fat)
Breed of sire	Brangus	Angus
Breed of dam	Brangus	Angus
No. in group	16	9
Av. init. wt.	367	334
No. days fed	170	188
Ave. final wt.	806	784
ADG on test	2.64	2.40
Ave. age end test (days)	350	368
Av. type score	9.7	12.3
Av. cond. score	9.3	11.4
Fat thickness (mm.)	4.6	7.5

Steers:

The steers were fed in groups by breed or breed combination. They were full-fed in dry lot. The ration used was the same as that fed to the bulls -- 75 percent concentrates and 25 percent roughage ratio. These steers were part of a combining ability study to evaluate performance and carcass merit. Data on the performance is shown in table 2.

Table 2

Post-Weaning Performance of Steers -- Fed in 1964-65

Group	Brangus	BA x F ₁	Ch x F ₁	Ch x BA
Breed of sire	Brangus	Brangus	Charolais	Charolais
Breed of dam	Brangus	F ₁	F ₁	Brangus
No. in group	6	9	6	7
Av. init. wt.	398	472	448	432
No. days fed	196	196	196	196
Av. final wt.	818	839	824	772
ADG on test	2.15	1.87	1.92	1.95
Av. age end test (days)	434	439	444	441
Av. type score	10.1	9.7	10.8	10.5
Av. cond. score	10.2	10.0	11.3	10.8
Feed/lb. gain	8.85	9.29	9.73	9.65

d. Slaughter Data:

Steers:

A summary of the slaughter and carcass information for steers is presented in table 3.

Table 3

Steer Slaughter Data -- 1965

Group	Brangus	BA x F ₁	Ch x F ₁	Ch x BA
Breed of sire	Brangus	Brangus	Charolais	Charolais
Breed of dam	Brangus	F ₁	F ₁	Brangus
No. slaughtered	6	9	6	7
Age at slaughter (days)	438	443	448	445
Days fed	196	196	196	196
Final wt. (feed lot)	818	839	824	815
Slaughter wt. ^a	798	821	808	805
Carcass wt. (cold)	458	487	489	493
Dressing % (cold)	57.40	59.06	60.61	61.20
Carcass grade (quality)	13.5	11.6	10.7	11.3
Carcass grade (yield) ^b	3.0	3.1	3.4	2.8
Kid fat %	3.2	2.8	3.3	3.0
Rib-eye/100 lb. carcass (sq. in.)	1.98	1.91	1.95	2.08

Table 3
(continued)

Marbling	11.5	12.0	10.3	10.0
Fat thickness over rib-eye (in.) ^c	.35	.45	.51	.45
Shear ^d	27.74	28.65	27.53	23.84

^a Obtained just before slaughter at packing company

^b Estimated by federal grader

^c Measured at three places and averaged

^d One inch core. Deep fat method of cooking

3. Improvement of facilities:

A new silo was constructed, marsh was sprayed to kill weeds and brush, and a fence was constructed in the marsh to provide additional pasture. Practically all damages from hurricanes in 1964 and 1965 have been repaired and a Sonoray ultrasonic animal tester, Model 12, has been purchased for measuring fat on cattle.

V. FUTURE PLANS:

The plans of the new project will be followed as outlined. The combining ability study will be discontinued.

Additional fences will be built for more pasture. Plans are to continue crowning, draining, and seeding the marsh to suitable forages for cattle, and to improve drainage where needed.

VI. PUBLICATIONS:

DeRouen, T. M., W. L. Reynolds, D. C. Meyerhoeffler, H. C. Gonsoulin, and N. T. Poche'. 1965. Beef cattle research at the Iberia Livestock Experiment Station. Fifth Livestock Producers' Day Report. Dept. of Animal Science, Louisiana State University and Agricultural Experiment Station, Baton Rouge, La.

DeRouen, T. M., W. L. Reynolds, R. S. Temple, C. M. Kincaid, D. C. Meyerhoeffler, and E. J. Warwick. 1965. Performance of progeny from Angus and Brahman bulls mated to straightbred and Angus-Zebu cross cows. J. Animal Sci. 24:287 (abstract).

Reynolds, W. L., T. M. DeRouen, D. C. Meyerhoeffler, J. N. Wiltbank, and R. S. Temple. 1965. Birth weight and gestation length of beef cattle. J. Animal Sci. 24:851 (abstract).

Reynolds, W. L., T. M. DeRouen, R. S. Temple, and D. C. Meyerhoeffler.
1965. Reproductive performance of Angus and Brahman bulls mated to straight-
bred and Angus-Zebu cross cows. J. Animal Sci. 24:287 (abstract).

Station Annual Report

VII. PUBLICATIONS PLANNED:

Review of the old breeding project

Evaluation of milk production of beef cows

Study of shrink in cattle

Death losses of calves following parturition

Submitted by: T. M. DeRouen

State Louisiana

Location		Jeanerette, Louisiana			
Breed of sire		Brangus	Brangus	Angus	Angus
Breed of dam		Brangus	F ₁	Angus	Angus
Line or group ¹		Brangus	C.A. ^a	Fat	Adapt.
Percent used in project		100	100	100	100
Inventory as of July 1, 1966	Cows 2 years and over	88	39	39	55
	Yearling heifers	46	6	19	15
	Bulls and steers under 1 year	27	--	13	11
	Heifers under 1 year	33	--	8	15
	Bulls over 1 year	26	--	12	16
	Steers over 1 year	--	6	--	--
Repro. perf.	Percent pregnant ²	70	87	72	58
	Calf survival percent ³	90	100	97	94
Wean. perf.	Adj. ADG ⁴	1.41	1.60	1.26	1.36
	Av. type sc. ⁵	8.3	10.2	9.0	9.8
Postweaning performance	No. of bulls	26	--	12	19
	No. of heifers	--	--	--	--
	No. of steers	6	9	--	--
Slaughtered	No. of bulls	7	--	12	5
	No. of heifers	--	--	--	--
	No. of steers	6	9	--	--
Remarks					

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent or percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustments: sex of calf and age of dam

5 - Suggest S-10 scoring system; indicate if different.

a Combining ability

Production, Inventory, and Performance Data, S-10 Herds - 1965-1966

State Louisiana

Location	Jeanerette, Louisiana			
Breed of sire	Charolais	Charolais		
Breed of dam	Brangus	F ₁		
Line or group ¹	C.A. ^a	C.A. ^a		
Percent used in project	100	100		
Inventory as of July 1, 1966	Cows 2 years and over			
	Yearling heifers	5	4	
	Bulls and steers under 1 year			
	Heifers under 1 year			
	Bulls over 1 year			
	Steers over 1 year	5	6	
Repro. perf.	Percent pregnant ²			
	Calf survival percent ³			
Wean. perf.	Adj. ADG ⁴	1.53	1.61	
	Av. type sc. ⁵	9.5	10.4	
Postweaning performance	No. of bulls			
	No. of heifers			
	No. of steers	7	6	
Slaughtered	No. of bulls			
	No. of heifers			
	No. of steers	7	6	
Remarks				

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent or percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustments: sex of calf and age of dam

5 - Suggest S-10 scoring system; indicate if different.

a Combining ability.

MISSISSIPPI STATE UNIVERSITY
Agricultural Experiment Station
State College, Mississippi

I. PROJECT: Hatch 666 (S-10)

A Study to Determine the Breeding Worth of Inbred and Outbred Bulls from Various Sources.

II. OBJECTIVES:

To compare pre- and postweaning growth rates, market grades, carcass qualities, carcass grades, and maternal ability of the progenies of potentially superior sires selected from various sources.

III. PERSONNEL:

C. E. Lindley, George Howse, F. M. Holmes and W. A. Pund.

IV. ACCOMPLISHMENTS DURING THE YEAR:

Weights and grades were collected at weaning on 166 Hereford calves from eight bull units, 109 Angus calves from four bull units, and 28 Shorthorn calves from two bull units. Average daily gains from birth to weaning - adjusted for sex and age of dam - and grades were as follows for each Hereford unit: Wilkes (W118), 1.51 and 9.0; Colorado 2008, 1.45 and 8.2; Colorado 2002, 9.2 and 1.68; Jones 038, 9.2 and 1.55; Virginia 2304, 10.2 and 1.58; MSU 490, 9.9 and 1.43; Victor 982, 9.3 and 1.56; New Mexico 4, 8.6 and 1.53. Shorthorn units: Virginia 2066, 11.3 and 1.54; MSU 541, 10.7 and 1.66. Angus units: Virginia 2036, 10.3 and 1.69; Woodruff 220, 10.6 and 1.65; Auburn 9513, 9.2 and 1.62; Eileenmere GA14, 10.2 and 1.56.

The first five steer calves born from four Hereford, three Angus and one Shorthorn bull were fed on a 241-day feeding test. Detailed carcass and palatability measurements were taken, and some of the results are shown in table 1.

Table 1
Carcass Data

Sire Group	ADG	Car. Grade	Yield Grade	Dressing Percentage	Length of Forearm	Cir. of Forearm	Length of Carcass	Lgth. of Loin
<u>Hereford</u>								
Colo. Pros. 9022	2.11	12.0	2.6	59.2	12.3	13.7	46.5	29.6
New Mex. 3	1.95	11.6	2.8	59.8	12.1	13.4	44.4	28.3
Victor 982	1.97	11.6	2.8	58.9	12.0	13.5	44.1	28.1
Wilkes	1.96	11.6	2.8	57.3	12.0	13.3	44.6	28.2
<u>Shorthorn</u>								
541	1.81	12.2	2.4	59.0	12.0	12.9	43.8	26.9
<u>Angus</u>								
Woodruff 220	1.72	13.0	2.2	59.4	11.6	12.4	44.3	27.1
Eileenmere 260	1.79	12.6	2.6	57.5	11.4	12.3	43.4	26.8
Auburn 9513	1.78	12.6	3.0	57.9	11.6	12.5	43.6	27.2

V. FUTURE PLANS:

The testing of various lines and the collection of data on their progeny will be continued. A cooperative agreement with the Virginia Station was initiated to test six lines of Angus cattle. The first matings will be made in 1966.

VI. PUBLICATIONS DURING THE YEAR:

Howse, George Henry. 1966. The Influence of Sire, Breed, System of Breeding of Sire and Systems of Breeding of Sire Within Breeds on Various Production and Carcass Traits in Beef Cattle. Unpublished Master's Thesis. Mississippi State University.

Lindley, C. E., 1965. Annual Report, Mississippi Farm Research, July 1965.

VII. PUBLICATIONS PLANNED:

Complete analysis of all data and publication of a technical bulletin.

Submitted by: C. E. Lindley

Production, Inventory, and Performance Data, S-10 Herds - 1965-1966

State Mississippi

Location		Prairie	Prairie	Prairie		
Breed of sire		Angus	Hereford	Shorthorn		
Breed of dam		Angus	Hereford	Shorthorn		
Line or group ¹						
Percent used in project		80	80	80		
Inventory as of July 1, 1966	Cows 2 years and over	158	255	40		
	Yearling heifers	38	42	12		
	Bulls and steers under 1 year					
	Heifers under 1 year					
	Bulls over 1 year					
	Steers over 1 year					
Repro. perf.	Percent pregnant ²	76.7	88.7	76.9		
	Calf survival percent ³	91.0	91.9	96.6		
Wean. perf.	Adj. ADG ⁴	1.63	1.53	1.59		
	Av. type sc. ⁵	10.1	9.2	11.0		
Postweaning performance	No. of bulls					
	No. of heifers					
	No. of steers	15	20	5		
Slaughtered	No. of bulls					
	No. of heifers					
	No. of steers	15	20	5		
Remarks						

- 1 - Purebreds, grade, line, sire number, crosses, treatment, etc.
- 2 - Use palpation percent or percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.
- 3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.
- 4 - Indicate adjustments:
- 5 - Suggest S-10 scoring system; indicate if different.

NORTH CAROLINA STATE UNIVERSITY
Agricultural Experiment Station
Raleigh, North Carolina

I. PROJECT: Animal Science 1010 (AH-d1-23 Rev. #2)

Genetic and Environmental Interactions for Performance and Carcass Traits
in Beef Cattle

II. OBJECTIVES:

- A. To evaluate the importance of sire-by-location interactions for performance traits.
- B. To evaluate sire-by-location and ration interaction for gain and carcass characteristics of steer progeny.
- C. To develop and evaluate selection criteria for the improvement of productive efficiency and market quality.

III. PERSONNEL:

E. U. Dillard, J. E. Legates, T. N. Blumer and Kenneth Koonce.

IV. ACCOMPLISHMENTS DURING THE YEAR:

In 1965 there were 304 cows in the four herds contributing to the genotype-environment interaction study. Artificial insemination was practiced in all herds although not all cows were bred artificially and a clean up bull was employed in all but one of the herds the latter part of the breeding season. Conception rate was determined by palpation. A few cows determined to be pregnant were sold because of low calf weights or disease. In the purebred herd at Raleigh a few cows found to be open were kept over. In three of the four herds only one cow diagnosed as pregnant failed to calve. In the other herd 6 cows failed to calve. It is believed there were some undetected abortions in this herd although it may have been that the rather wide range in breeding dates may have contributed to errors by the persons doing the palpation.

In the 1964-65 ROP test for postweaning gain eighteen (18) bulls were fed for a period of 154 days. The ration used was of the same formula as that used each year since 1960. Performance data for these bulls are shown in table 1.

The preweaning performance of the 1965 calves is shown in table 2. Data included here are for calves by sires of the genotype-environment study only. Calves by cleanup sires at Butner and Plymouth are not included. For Raleigh some of the calves are by natural service by bulls 2002 and 2028.

The small number of calves by sire no. 2028 at Butner results from the fact that many cows bred to this bull did not settle and rather than risk a poor calf crop, cows repeating after the first few returns were bred to another sire. At Raleigh bulls 2002 and 2028 were used naturally as well as artificially and sire 6630 had poor conception rate and, in addition, two of his progeny died before weaning.

Table 1. Performance data for 1963 bull calves fed for 154 days postweaning

Sire No.	No. of Progeny	Adj. 205-day Wt.	ADG on 154 Day Test	Wt./D.A. End of Test	Final Grade
0030	6	409	2.55	2.25	10.3
0100	4	350	2.49	2.05	9.5
6630	7	391	2.72	2.23	9.6
? (1)	1	314	2.63	1.86	9.0

(1) Bull calf purchased in dam

Table 2. Preweaning performance of 1965 calves in genotype-environment study

Location	Sire No.	Sex	Number	Adj. 205-day Wt.	Type Score
Raleigh	2002	B	10	403	10.2
		H	14	411	9.3
	2028	B	4	398	9.3
		H	7	411	9.3
	6630	B	2	436	12.0
		O	—	—	—
Plymouth	2002	S	7	381	9.1
		H	9	373	9.3
	2028	S	2	409	9.5
		H	6	397	9.8
	6630	S	10	397	9.5
		H	10	443	10.1
Laurel Springs	2002	S	6	467	10.0
		H	11	403	9.3
	2028	S	7	462	9.4
		H	9	451	10.1
	6630	S	9	458	10.1
		H	9	455	10.3
Butner	2002	S	14	381	9.5
		H	4	362	9.5
	2028	S	3	337	9.0
		H	2	381	10.0
	6630	S	14	384	9.6
		H	18	378	9.9

V. FUTURE PLANS:

The genotype-environment study is being phased out with the 1965 breeding season. Progenies will be evaluated for rate of gain and carcass data through 1967. Female progeny will be evaluated for several years.

Two new studies are now being prepared for consideration.

VI. PUBLICATIONS:

Vaccaro, Rodolfo and E. U. Dillard. Relationship of Cow Weight Changes to Calf's Growth Rate. Journal of Animal Science. 24:857-858. 1965. (Abstract)

Dillard, E. U. and J. H. Gregory. Performance and Progeny Testing Bulls. Animal Science Report No. 161, Animal Breeding Series No. 6. 1965.

Hill, James Riley, Jr. 1965. The Inheritance of Maternal Effects in Beef Cattle. Ph. D. Thesis. N. C. State University, Raleigh, N. C.

VII. PUBLICATIONS PLANNED:

Vaccaro, Rodolfo and E. U. Dillard. Relationship of Dam's Weight and Weight Changes to Calf's Growth Rate in Hereford Cattle. (Accepted for publication JAS).

VIII. COOPERATING AGENCIES:

N. C. Department of Agriculture and N. C. Department of Mental Health.

Submitted by: E. U. Dillard

Production, Inventory, and Performance Data, S-10 Herds - 1965-1966

State North Carolina

Location		Raleigh	Plymouth	Laurel Springs	Butner	
Breed of sire		Hereford	Hereford	Hereford	Hereford	
Breed of dam		Hereford	Hereford	Hereford	Hereford	
Line or group ¹		Purebred	grade	grade	grade	
Percent used in project		100	100	60	100 ^{/6}	
Inventory as of July 1, 1966	Cows 2 years and over	80		83	87	
	Yearling heifers	28	26	21	22	
	Bulls and steers under 1 year	23	38	31	34	
	Heifers under 1 year	32	36	28	22	
	Bulls over 1 year	6	0	0	0	
	Steers over 1 year	1.6 ^{/7}	23	29	<u>17</u>	
Repro. perf.	Percent pregnant ²	41	81	78	81	
	Calf survival percent ³	89	89	96	93	
Wean. perf.	Adj. ADG ⁴	1.66	1.60	1.81	1.48	
	Av. type sc. ⁵	9.7	9.6	9.9	9.7	
Postweaning performance	(1964 calves) No. of bulls	18	0	0	0	
	No. of heifers	17	25	22	29	
	No. of steers	17 ^{/7}	19	20	<u>17</u>	
Slaughtered	No. of bulls	16	0	0	0	
	No. of heifers	0	0	0	0	
	No. of steers	17 ^{/7}	19	20	<u>17</u>	
Remarks to 4 & 5		Some naturally sired calves				

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent or percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving. Based only on cows inseminated.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent. From cows inseminated.

4 - Indicate adjustments: Adjusted for sex and age of dam.

5 - Suggest S-10 scoring system; indicate if different.

6 - Only grade Hereford cattle contributing to this project included here & in all data.

7 - Sample of steer progenies from Butner moved to Raleigh for postweaning evaluation.

CLEMSON UNIVERSITY
Agricultural Experiment Station
Clemson, South Carolina

I. PROJECT: SC-479 (S-10)

The Response of Sire Progenies to Management and Feeding Procedures

II. OBJECTIVES:

To investigate the response of sire progenies, as measured by live animal and carcass traits to methods of producing slaughter cattle.

To evaluate the magnitude and importance of the average genotype with certain environmental influences.

To develop, through selection, herds of beef cattle with superior performance under South Carolina condition.

III. PERSONNEL:

W. C. Godley, H. H. Pierce, G. C. Skelley, Jr., R. M. Rauton, R. R. Ritchie

IV. ACCOMPLISHMENTS DURING THE YEAR:

One hundred nineteen purebred Angus and eighty-nine purebred Polled Hereford cows were put in the breeding herds to produce the 1965 calf crop. Approximately 88.5 per cent of these cows conceived as determined by pregnancy examination. Three cows, diagnosed pregnant, were disposed of prior to calving. Seven of the 171 calves produced were born dead. This is a significant reduction in calves born dead from the previous year. Approximately ten per cent of the calves produced in the 1964 calf crop were dead at birth. Although the conception rate was higher at the Clemson Station the percentage calf crop weaned (79.8) was the same at both stations. The range in percent calf crop weaned by sire groups was from 73 to 80 at Clemson and from 70 to 91 at the Coast Station. The Angus calves produced at Clemson were approximately 65 pounds heavier at weaning than were the Herefords. A similar comparison at the Coast Station showed a 50 pound advantage for the Angus. Calves produced at Clemson were approximately 40 pounds heavier at weaning than those produced at the Coast Station.

Forty Angus and Polled Hereford steers produced in the 1964 calf crop were fed on post weaning trials. Nine Angus and nine Polled Hereford bull calves produced in the 1964 calf crop were fed on pasture on a 140 day ROP feeding trial. Fifty-seven Angus and Polled Hereford steers produced in the 1965 calf crop were started on a post weaning test that extended into 1966. Twelve Angus bull calves sired by four bulls and eight Hereford bull calves also sired by four bulls were selected for post weaning testing.

All cows were checked for pregnancy in September of 1964. A summary of the 1964 breeding season is presented in table 1.

TABLE 1. Summary of the 1964 Breeding Season

	Coast Station	Clemson Station
Number cows exposed	104	105
Number cows diagnosed pregnant	88	96
Number cows died or sold pregnant	1	3
Number calves born	86	89
Number calves weaned	83	84
Calving percent weaned	80.6	82.4

A study of infertility involving 494 females in the University beef herds was completed. Eighty-seven percent of the cows conceived following a 75 day natural service period. Cows failing to conceive during a natural service period were assembled at the University for a ten week period. During the ten week period they were bred by artificial insemination. Conception rates resulting from artificial insemination were 41 percent the first year and 47 percent the second year - considerably below what would be anticipated in a normal group of cows. Various tests and sampling procedures, including culturing for bacteria, hematocrit values, white blood cell counts, hemoglobin values, blood urea nitrogen estimates, and blood serology (brucellosis, leptospirosis, and anaplasmosis) failed to reveal any pattern that could be associated with infertility.

V. FUTURE PLANS:

This project is being phased out. A new project is in the planning stage and will be submitted for approval of the Technical Committee as soon as possible.

VI. PUBLICATIONS DURING THE YEAR:

Hurst, Victor, J. W. Kelley, W. C. Godley, J. R. Hill, Jr., H. S. Powell, and D. E. Roebuck. 1965. Infertility in Beef Cattle. South Carolina Experimental Station Tech. Bul. 1020.

VII. PUBLICATIONS PLANNED:

Godley, W. C., J. F. Wise and E. G. Godbey. 1966. Effects of Age and Weight of Dam and Sex of Calf on Birth and Weaning Weight of Beef Calves. Submitted for publications as South Carolina Exp. Sta. Tech. Bul.

Hayden, T. E. 1966. The Response of Sire Progenies to Management Procedures. Master's Thesis.

Prepared by: W. C. Godley

State South Carolina

Location		Clemson	Clemson	Coast	Coast	
Breed of sire		Angus	Hereford	Angus	Hereford	
Breed of dam		Angus	Hereford	Angus	Hereford	
Line or group ¹						
Percent used in project						
Inventory as of July 1, 1966	Cows 2 years and over	75	66	64	47	
	Yearling heifers	22	18	15	14	
	Bulls and steers under 1 year	19	12	18	15	
	Heifers under 1 year	24	22	18	19	
	Bulls over 1 year	10	8	3	2	
	Steers over 1 year	0	0	0	0	
Repro. perf.	Percent pregnant ²	93.3	88.9	86.4	81.8	
	Calf survival percent ³	94.1	100.00	94.0	100.00	
Wean. perf.	Adj. ADG ⁴	2.0	1.7	1.8	1.5	
	Av. type sc. ⁵	11.8	10.3	11.13	10.2	
Postweaning performance	No. of bulls	5	5	4	4	
	No. of heifers	23	10	22	10	
	No. of steers	15	8	12	4	
Slaughtered	No. of bulls	5	5	1	3	
	No. of heifers	0	0	0	0	
	No. of steers	15	8	12	4	
Remarks						

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent or percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born(dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustments:

5 - Suggest S-10 scoring system; indicate if different.

UNIVERSITY OF TENNESSEE
Agricultural Experiment Station
Knoxville, Tennessee

I. PROJECT: Hatch 61, AH Line Project dl-9 (S-10)

The Improvement of the Producing Ability of Beef Cattle.

II. OBJECTIVES:

To develop lines, line crosses, or combinations of lines and crosses of beef cattle which will make the most efficient use of Tennessee pastures and forages and which will result in an improvement of such characters as rate of gain, economy of gain, carcass quality, fertility, and longevity.

To develop effective breeding techniques for the improvement of existing lines of beef cattle.

To investigate the effect of different levels of nutrition on the development of type and conformation, economy of gain, fertility, and longevity.

III. PERSONNEL:

C. S. Hobbs, J. B. McLaren, J. W. Cole, C. B. Ramsey, R. A. Reynolds, W. T. Butts, W. L. Sanders, J. H. Felts, and J. A. Odom.

IV. ACCOMPLISHMENTS DURING THE YEAR:

Performance records from birth to weaning were collected on about 667 calves. These data include performance records on the progeny of 20 Hereford sires at three locations and 27 Angus sires at three locations.

Two groups of cows -- irradiated in 1961 and 1962, respectively, in connection with the UT-AEC project to evaluate the effect of irradiation on lifetime performance -- calved in 1965. Carcass data were obtained on 83 steer and 80 heifer progeny by eight sires from the 1964 calves. Postweaning performance and carcass data will be obtained on 92 steer and 75 heifer progeny by eight sires from the 1965 calves. The eight sires represent two levels of nutrition during their development period and the progeny will be subjected to the same two feeding regimes during their postweaning finishing period.

Sixty-seven Hereford and Angus bull calves from the various stations and nine calves purchased from purebred breeders were fed from weaning to approximately 20 months of age to compare four methods of developing herd bulls and to obtain performance data on individuals and sire progeny. Postweaning performance data were obtained on 51 Angus bull calves at Ames Plantation.

Feedlot performance and carcass data were obtained on 10 trios -- untreated bull, diethylstilbestrol-treated bull, steer. These data will be analyzed and presented in 1966.

Thirty-six steers were finished on rations adjusted to produce a slaughter condition of 0.2, 0.4, and 0.6 inches of fat over the rib at the end of the feeding period. Ration had a significant effect on gain and carcass weight, but had little or no apparent effect on the muscular and skeletal development of the carcass in the three treatments, as shown by round cut-out and skeletal measurements. Preliminary palatability studies indicate no significant difference among treatments for cooking losses, shear test, and panel scores for tenderness, juiciness, and flavor. Additional data obtained from 78 steers and heifers will be analyzed.

A preliminary investigation into the effect of cow condition on various production traits was initiated at the Plateau Experiment Station in 1965. Ultrasonic estimates of fat over the rib and subjective condition scores were obtained on approximately 200 cows. These measurements were made in the spring, mid-summer, and fall. Collection of these data will be continued.

In the cooperative program with the Extension Service, individual calf records have been processed on approximately 2,400 calves from 80 herds.

V. FUTURE PLANS:

Present breeding projects will continue at the different locations.

Emphasis will be given to carcass evaluation and consumer acceptance phases.

Progeny testing at the Oak Ridge Station of bulls developed by different methods will be continued.

Increased emphasis will be placed upon obtaining postweaning performance and carcass data from sire progenies.

VI. PUBLICATIONS DURING THE YEAR:

Cole, J. W., C. B. Ramsey, W. C. Huff, C. S. Hobbs, and R. S. Temple. 1966. Effects of three controlled levels of fatness on production, carcass composition, quality and organolyptic qualities of beef steers. J. Animal Science 25:255. (Abs.).

Ramsey, C. B., J. W. Cole, R. S. Temple and C. S. Hobbs. 1966. Prediction of separable muscle in carcasses of seven breeds of steers. J. Animal Sci. 25:256. (Abs.)

Sliger, R. L., C. B. Ramsey, J. W. Cole, and C. S. Hobbs. 1966. The relationships of chronological and physiological age of beef females to carcass and palatability characteristics. J. Animal Sci. 25:255. (Abs.)

VII. PUBLICATIONS PLANNED:

None

Submitted by: C. S. Hobbs

State Tennessee

Location		TES	Plateau PES	Oak Ridge O.R.	Alcoa	Alcoa
Breed of sire		Polled Hereford	Angus	Hereford	Hereford	Angus
Breed of dam		Polled Hereford	Angus	Hereford	Hereford	Angus
Line or group ¹		Purebred P.B.	Purebred P.B.	Grade	Purebred P.B. Spring	Purebred P.B. Spring
Percent used in project		100	100	100	100	100
Inventory as of July 1, 1966	Cows 2 years and over	63	205	206	156	118
	Yearling heifers	18	49	0	49	33
	Bulls and steers under 1 year	26	92	65	74	51
	Heifers under 1 year	27	71	69	61	54
	Bulls over 1 year	--	--	--	38	25
	Steers over 1 year			--		
Repro. perf.	Percent pregnant ²	97	89	83	77	96
	Calf survival percent ³	90	85	94	87	78
Wean. perf.	Adj. ADG ⁴	1.80	1.88	1.96	1.90	1.81
	Av. type sc. ⁵	11.4	12.5	12.1	12.2	12.4
Postweaning performance	No. of bulls	8	21		14	10
	No. of heifers	12	61	80	26	22
	No. of steers		30	83	15	35
Slaughtered	No. of bulls					
	No. of heifers			80	16	14
	No. of steers		30	83	15	35
Remarks						

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent or percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustments:

5 - Suggest S-10 scoring system; indicate if different.

(continued)

Production, Inventory, and Performance Data, S-10 Herds 1965-1966

(continued)

State Tennessee

Location	Alcoa	Alcoa	Ames	Ames	
Breed of sire	Hereford	Angus	Angus	Angus	
Breed of dam	Hereford	Angus	Angus	Angus	
Line or group ¹	P.B. fall	P.B. fall	spring P.B.	P.B. fall	
Percent used in project	100	100	100	100	
Inventory as of July 1, 1966	Cows 2 years and over		263		
	Yearling heifers		63		
	Bulls and steers under 1 year		80		
	Heifers under 1 year		66		
	Bulls over 1 year		47		
	Steers over 1 year				
Repro. perf.	Percent pregnant ²	90	85	64	77
	Calf survival percent ³	95	93	88	92
Wean. perf.	Adj. ADG ⁴	1.65	1.89	1.72	1.70
	Av. type sc. ⁵	11.9	12.2	12.1	12.4
Postweaning performance	No. of bulls		51		
	No. of heifers				
	No. of steers				
Slaughtered	No. of bulls				
	No. of heifers				
	No. of steers				
Remarks					

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent or percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustments:

5 - Suggest S-10 scoring system; indicate if different.

TEXAS A&M UNIVERSITY
Agricultural Experiment Station
College Station, Texas

I. PROJECT: Hatch 2101

Breeding Methods for Beef Cattle in the Southern Region (S-10)

II. OBJECTIVES:

Omitted

III. PERSONNEL:

T. C. Cartwright (leader), W. E. Kruse, A. A. Melton, J. K. Riggs, H. O. Hill, G. T. King

IV. ACCOMPLISHMENTS DURING THE YEAR:

Combining breeds in such a manner as to utilize discriminantly the advantage of the males and females of each breed and at once to create hybrid vigor has been developed as an efficient breeding system. Combining selected high gaining ability, particularly in the dam, has resulted in calves approaching 1000 lb. at 365 days. This system, especially with developmental adjustments and improvements, compounds the economic advantages of both gain ability and hybrid vigor so that very substantial improvement of production efficiency can result.

Analyses of feed efficiency data which are independent of intake indicate that there are differences in feed conversion associated with sires. From p-variate analyses residual (within sire-period subclasses) and sire-mean correlations did not exceed 0.39. Heritability estimates for gain, independent of feed intake (and therefore equivalent to efficiency of feed utilization), during four successive periods and for 32-week gain were 0.34, 0.41, 0.56, 0.63, and 0.64, respectively. Partial sire and residual correlations, independent of carcass weight, between 32-week gain and weights of loin, rib, round and rump, chuck and their sum were -.15, -.10; -.38, -.17; 0.47, -.03; 0.63, 0.09; 0.46, -.06, respectively.

V. FUTURE PLANS:

Developing specific systems of crossing; i.e., specific breeds; for (1) exploiting hybrid vigor (2) utilizing gain ability and (3) reducing maintenance feed costs (4) and increasing net fertility will continue. Particular new emphasis will be placed on evaluating hybrid cows from small parental breeds such as the Jersey and Angus.

VI. PUBLICATIONS DURING THE YEAR:

Melton, A. A., J. K. Riggs, L. A. Nelson and T. C. Cartwright. 1966. Milk production and calf gains of Angus, Charolais and Herefords. Jour. Animal Sci. 25:253. (abstr.)

Fitzhugh, H. A., Jr., T. C. Cartwright and St. C. S. Taylor. 1967. Post-weaning gains of cattle fed similar amounts. Jour. Animal Sci. 26: . (Abstr. in press).

Fitzhugh, H. A., Jr., T. C. Cartwright and St. C. S. Taylor. 1967. Post-weaning feed efficiency as related to boneless trimmed beef carcass cuts. Jour. Animal Sci. 26: (abstr. in press).

Brown, J. E., T. C. Cartwright, and W. E. Kruse. 1967. General and specific combining ability for birth weight of beef cattle. Jour. Animal Sci. 26: (abstr. in press).

Dubose, L. E. and T. C. Cartwright. 1967. Relationships among production and carcass traits in cattle. Jour. Animal Sci. 26: (abstr. in press).

VII. PUBLICATIONS PLANNED:

None indicated

I. PROJECT: Hatch 2102

Breeding Methods for Beef Cattle in the Southern Region (S-10)

II. OBJECTIVES:

Omitted

III. PERSONNEL:

T. C. Cartwright, H. A. Fitzhugh, Jr., W. E. Kruse, A. A. Melton, H. O. Hill

IV. ACCOMPLISHMENTS DURING THE YEAR:

Weight-age curves have been found to be relatively inflexible creating correlations among rates of gain and weights at different ages or stages of maturity. Individuals within breeds follow a more or less characteristic pattern for that breed. For example Angus cows were found to mature earlier than Hereford cows in S-10 Southern Region Experiment Station herds. Also, analyses of S-10 data showed that weight and age of dam tended to account for similar sources of variation in progeny gains (substantiating earlier work on this project) but that the ratio of average daily gain per unit of dam weight was negatively related to dam weight in each herd.

Optimal slaughter weights for steers produced by breeds of different sizes were found to vary considerably. For example steers of breeds that gain 1.8 lb./day at 10 mo. (800 lb. mature) should be slaughtered at approximately 650 lb. to gain the maximum amount of beef for feed intake if the ratio of live weight sale price of feed is 10. Whereas, a steer of 3.5 lb./day gain (1900 lb. mature wt.) would have an optimal slaughter weight of approximately 1300 lb. As the price ratio decreases slaughter weights decrease but to a lesser degree for cattle of slower rates of gain. It is interesting to note that these slaughter weights project up to 1600-1800 lb. for very high gainers in a favorable ratio (12+) situation. The immediate use of this research is to afford a basis for comparing efficiency of different breeds of cattle from the standpoint of return on investment as well as beef produced per unit of TDN.

V. FUTURE PLANS:

Emphasis will be directed toward obtaining and describing more basic weight-age data for cattle of different breeds and crosses. Selection indexes for straightbreds will be developed properly taking into account the overall significance of mature size especially so that logical economic decisions can be made concerning keeping the heavier heifers at weaning for replacements or selling them for slaughter.

Analyses of S-10 regional data are substantially complete for a Ph.D. dissertation should be completed during 1967 for the following problem and objectives.

Title: A biometrical evaluation of growth and weight of Angus and Hereford cows and their progeny.

Objectives:

1. To evaluate the interrelationships among body weight, changes in weight and age of beef cows, independent of genetic and environmental sources of variation.
2. To evaluate the interrelationships among age, body weight, weight

changes of dams and growth of their progeny, independent of genetic and environmental sources of variation.

3. To determine genetic and phenotypic relationships among measures of growth of cattle.

VI. PUBLICATIONS DURING THE YEAR:

Petty, R. R., Jr., T. C. Cartwright and R. J. Cooper. 1965. A theoretical comparison of selection indexes for beef cattle. Jour. Animal Sci. 24:281 (abstr.)

Petty, R. R., Jr., C. C. Baykin, Jr., and B. R. Eddleman. 1965. Estimated cost of maintaining a beef cow in Texas. Beef Cattle Research in Texas, 1965, Texas Agric. Exp. Sta. Prog. Rpt. 2370.

Fitzhugh, H. A., Jr., T. C. Cartwright and R. S. Temple. 1965. Effects associated with beef cow weight. Jour. Animal Sci. 24:848 (abstr.)

Dickey, J. R. and T. C. Cartwright. 1966. Reproduction in tropically adapted beef cattle. Jour. Animal Sci. 25:251 (abstr.)

DuBose, L. E., T. C. Cartwright and R. J. Cooper. 1966. Predicting steak and roast meat from production and carcass traits. Jour. Animal Sci. 25:255 (abstr.)

Petty, R. R., Jr., and T. C. Cartwright. 1966. A summary of genetic and environmental statistics for growth and conformation traits of young beef cattle. Texas A&M Univ., Dept. of Animal Sci. Tech. Rpt. No. 5.

Cartwright, T. C. 1966. Maximizing genetic improvement in beef cattle with respect to economic factors. Proc. IBM 4th Agric. Symposium, San Jose, Calif.

Oliver, W. M. 1966. Shape or weight in cattle for beef. Texas A&M Univ., Dept. of Animal Sci. Tech. Rpt. 6.

Cartwright, T. C. 1966. Size of cow as a factor in efficiency of production. 1966 Proceedings 16th Beef Shortcourse, Tex. A&M Univ., Dept. of Animal Sci. Tech. Rpt. No. 8.

Fitzhugh, H. A., Jr. 1966. Factors including dam weight affecting preweaning gain of beef calves. Proc. 9th International Cong. Animal Prod., Edinburgh, Scot.

Fox, J. D., T. C. Cartwright and H. A. Fitzhugh, Jr. 1967. Repeatability of cattle weights taken at short intervals. J. Animal Sci. 26: (abstr. in press).

Nelson, L. A., T. C. Cartwright and H. A. Fitzhugh, Jr. 1967. Weightage curves of Angus and Hereford cows. J. Animal Sci. 26: (abstr. in press).

Chapman, H. D. and T. C. Cartwright. 1967. Change in selection emphasis given rate of gain due to mature size consideration. J. Animal Sci. 26: (abstr. in press).

Cartwright, T. C. and G. E. Joandet. 1967. Effect of growth rate on optimum slaughter weight of cattle. J. Animal Sci. 26: (abstr. in press).

Fitzhugh, H. A., Jr., T. C. Cartwright and R. S. Temple. 1967. Genetic and environmental factors affecting weight of beef cows. J. Animal Sci. (in press).

VII. PUBLICATIONS PLANNED:

None indicated.

I. PROJECT: Hatch 1583

Efficiency of Beef Production as Affected by Body Size and Breed of Dam

II. OBJECTIVES:

Omitted.

III. PERSONNEL:

A. A. Melton (leader), T. C. Cartwright, Walter Kruse, H. O. Hill

IV. ACCOMPLISHMENTS DURING THE YEAR:

A full year's data are not yet available, however, some data analyses have been made through weaning. Intrabreed and sex of calf correlations between cow size and cow feed, milk yield, calf gain, calf feed and total feed were either very low or negative. Cow feed was rather highly positively correlated with milk yield and calf gain. Calf gain, with the exception of one small group, was highly positively correlated with milk yield and cow feed but not with calf feed until milk yield was held constant. Calf feed and milk were moderately positively correlated in the Charolais but moderately negatively correlated in the Hereford.

Feed is the largest cost item in the beef cow herd enterprise. Beef cows vary considerably in mature size within a breed and between breeds, and cow size could be a criterion to predict differences among cows in feed requirements. Variations among cows in feed requirements could have a great effect upon beef production costs and returns per acre of land devoted to the beef cow enterprise.

V. FUTURE PLANS:

The work will be continued as outlined in the project proposal.

VI. PUBLICATIONS DURING THE YEAR:

None

VII. PUBLICATIONS PLANNED:

None indicated.

I. PROJECT: State 1359

Sources of Variation in Efficiency of Feed Use in Drylot by Young Beef Cattle

II. OBJECTIVES:

Omitted

III. PERSONNEL:

Walter E. Kruse, T. C. Cartwright, (leaders), J. E. Huston, G. T. King, H. O. Hill, J. M. Shelton

IV. ACCOMPLISHMENTS DURING THE YEAR:

Five groups of Hereford steers have been fed. The first 10 steers were in a preliminary study to test experimental procedure. Age variations is limited to 30 days and weight variation of steers compared one with another is limited to 50 pounds. Pre-test adjustment period is 42 days with 224 days on test. All animals are offered the same amount of feed twice daily with the amount of feed offered limited to amount eaten by the least hungry.

The daily gain of each steer is nearly an exact reflection of his efficiency. Pounds of feed per pound of gain correlated with daily gain perfectly but inversely. The difference in daily gain, highest over lowest, in 1961-62 was .46, 1962-63 was .59, 1963-64 was .51, 1964-65 was .44 and 1965-66 was .35.

There appears to be a negative correlation between 180 day weight and feed required per pound of gain in dry lot. Heavier calves in the herd at weaning appear to be more efficient in the feedlot.

These results show that these are differences in digestive and/or metabolic efficiency. These differences are great enough to be of considerable importance in cattle selection by gain performance tests or in commercial cattle.

V. FUTURE PLANS:

Continued emphasis will be placed on the evaluation of efficiency of feed use by breeding methods. The work will be broadened to include bulls, steers and heifers of several breeds and crosses. Two lengths of feeding periods will be used, short - 112 day and long - 224 day. Two feeding methods will be used - full feed and limited to least hungry animal. The technique will be refined to include two digestibility trials per test and determinations of rumen volatile fatty acid.

VI. PUBLICATIONS DURING THE YEAR:

Kruse, W. E., T. C. Cartwright and G. T. King. 1966. Efficiency of feed use in drylot by young beef cattle. PR-2418.

Kruse, W. E. and T. C. Cartwright. 1966. Efficiency of feed utilization in Hereford steers. J. Animal Sci. 25: (in press).

VII. PUBLICATIONS PLANNED:

None indicated

I. PROJECT: State 1547

Genetics of Qualitative Characters in Beef Cattle

II. OBJECTIVES:

Omitted

III. PERSONNEL:

D. F. Weseli (leader), T. C. Cartwright

IV. ACCOMPLISHMENTS DURING THE YEAR:

The isoimmunization series continued from 1965 have resulted in the production of a total of 67 antisera from 82 immunizations. From the antisera 18 reagents have been made.

Electrophoretic techniques to detect genetic variations of serum proteins (transferrins) and hemoglobins have been standardized using discontinuous polyacrylamide gel electrophoresis for transferrins and cellulose polyacetate electrophoresis for hemoglobins. Supporting breeding and production data are being collected and coded for IBM punching.

Electrophoretic tests to detect genetic variants of milk proteins are being investigated. The extensive chemical pretreatment of the samples required with starch gel electrophoresis precludes its use for large numbers. A modified high-urea polyacrylamide gel proved partially successful in our tests but needs more standardization.

Experiments to isolate and biochemically characterize erythrocyte iso-antigens have been started. Digestion with proteolytic enzymes of freeze-dried, alkali hydrolyzed erythrocyte stroma and subsequent separation by gel filtration has been attempted. Recovery of many antigenic properties has been very poor and evidence is accumulating that antigenicity is not associated with the peptide moiety of the preparations.

V. FUTURE PLANS:

The isoimmunization series and reagent development program will continue. The 40 selected reagents needed for starting red cell typing should be obtained in late 1967. The feasibility of automating red cell typing will be investigated. Associations of genetic transferrin and hemoglobin types with production characters will be completed for experimental cattle herds. Work will continue on development of suitable simplified techniques of detecting genetic variants of milk proteins and systemic enzymes.

VI. PUBLICATIONS DURING THE YEAR:

None

VII. PUBLICATIONS PLANNED:

None indicated

I. PROJECT: RI-1622

Research Initiation - Cytogenetics

II. OBJECTIVES:

Omitted

III. PERSONNEL:

Nat M. Kieffer (leader), T. C. Cartwright

IV. ACCOMPLISHMENTS DURING THE YEAR:

Techniques for in vitro culturing of bovine tissues have been developed. Chromosomes from somatic cells of approximately 50 "normal" cattle have been observed within Bos taurus and Bos indicus. The percentage of cells having abnormal chromosomes and the nature of the abnormalities have been recorded. Thirteen dwarf cattle have been karyotyped. The chromosomal picture in these cattle coincides with that found in "normal" cattle. The major finding in this laboratory to date is the observation that the Y chromosome of Bos indicus cattle is morphologically different from Bos taurus cattle. This finding may possibly shed light on the evolution of the cattle genus.

V. FUTURE PLANS:

Continue investigation of chromosomal variation as to number, size, and intra chromosomal morphology in normal cattle. Concurrent studies of the karyotypes of abnormal cattle will be made.

VI. PUBLICATIONS DURING THE YEAR:

Kieffer, Nat M. and T. C. Cartwright. 1967. The Y chromosomes of Bos indicus and Bos taurus. J. Animal Sci. 26: (abstr. in press).

VII. PUBLICATIONS PLANNED:

None indicated

Production, Inventory, and Performance Data, S-10 Herds - 1965-1966

State Texas

Location		McGregor	McGregor	McGregor	McGregor	McGregor
Breed of sire		A	B	C	L	G
Breed of dam		A	B	C	L	G
Line or group ¹		Regis- tered	Regis- tered	Regis- tered	Regis- tered	Regis- tered
Percent used in project		100	100	100	100	100
Inventory as of July 1, 1966	Cows 2 years and over	33	26	19	18	20
	Yearling heifers	10	1	2	10	--
	Bulls and steers under 1 year	18	10	2	12	3
	Heifers under 1 year	12	9	1	8	3
	Bulls over 1 year	3	6	2	5	3
	Steers over 1 year					
Repro. perf.	Percent pregnant ²	100	82	61	61	75
	Calf survival percent ³	94	89	83	83	81
Wean. perf.	Adj. for age only Adj. ADG ⁴ 180 days	2.1	2.0	2.4	2.4	2.6
	Av. type sc. ⁵	0	0	0	0	0
Postweaning performance	No. of bulls	7	5	3	6	3
	No. of heifers	4/8*	5/4	0/2	1/12	
	No. of steers	5	2		1	
Slaughtered	No. of bulls					
	No. of heifers		1			
	No of steers	4				
Remarks						

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent or percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustments:

5 - Suggest S-10 scoring system; indicate if different.

* - 140 days/112 days
feedlot/ grazing

Production, Inventory, and Performance Data, S-10 Herds - 1965-1966

State Texas

Location		McGregor	McGregor	McGregor	McGregor	McGregor
Breed of sire		B	G	G	G	G
Breed of dam		24x	H	11x	32x	33x
Line or group ¹		Grade	Grade	Grade	Grade	Grade
Percent used in project		100	100	100	100	100
Inventory as of July 1, 1966	Cows 2 years and over	--	6	28	6	1
	Yearling heifers	1	--	1	6	1
	Bulls and steers under 1 year	2	--	1	14	2
	Heifers under 1 year	4	1	2	10	1
	Bulls over 1 year					
	Steers over 1 year				2	
Repro. perf.	Percent pregnant ²		57	65	35	50
	Calf survival percent ³		80	91	61	100
Wean. perf.	Adj. ADG ⁴	2.1		2.7	2.6	2.2
	Av. type sc. ⁵	--	--	--	--	--
Postweaning performance	No. of bulls					
	No. of heifers	0/1		0/1	2/9	0/4
	No. of steers					1
Slaughtered	No. of bulls					
	No. of heifers					1
	No. of steers			1	5	
Remarks						

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent or percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustments:

5 - Suggest S-10 scoring system; indicate if different.

State Texas

Location		McGregor	McGregor	McGregor	McGregor	McGregor
Breed of sire		H	H	B	B	B
Breed of dam		H	H	H	4x	23x
Line or group ¹		Registered Grade	Registered Grade	Registered Grade	Registered Grade	Registered Grade
Percent used in project		100	100	100	100	100
Inventory as of July 1, 1966	Cows 2 years and over	98	91	30	9	9
	Yearling heifers	19	14	--	--	--
	Bulls and steers under 1 year	20	24	--	--	5
	Heifers under 1 year	44	27	--	--	4
	Bulls over 1 year	19				
	Steers over 1 year		15			4
Repro. perf.	Percent pregnant ²	87	87	77	85	75
	Calf survival percent ³	90	90	93	79	72
Wean. perf.	Adj. for age only Adj. ADG ⁴	2.0	2.0			2.3
	Av. type sc. ⁵	--	--	--	--	--
Postweaning performance	No. of bulls	20				
	No. of heifers	5/ 34	5/35			0/2
	No. of steers		38			5
Slaughtered	No. of bulls					
	No. of heifers		9			
	No. of steers		23			6
Remarks						

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent or percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustments:

5 - Suggest S-10 scoring system; indicate if different.

Production, Inventory, and Performance Data, S-10 Herds - 1965-1966

State Texas

Location		McGregor	McGregor	McGregor	McGregor	McGregor
Breed of sire		G	G	G	G	G
Breed of dam		R	51x	52x	61x	62x
Line or group ¹		Grade	Grade	Grade	Grade	Grade
Percent used in project		100	100	100	100	100
Inventory as of July 1, 1966	Cows 2 years and over	1	7	--	4	--
	Yearling heifers	--	--	1	--	1
	Bulls and steers under 1 year			3		3
	Heifers under 1 year			3		
	Bulls over 1 year					
	Steers over 1 year			1		
Repro. perf.	Percent pregnant ²	100	67		100	
	Calf survival percent ³	100	79		75	
Wean. perf.	Adj. ADG ⁴		2.7	2.3		2.5
	Av. type sc. ⁵	--	--	--	--	--
Postweaning performance	No. of bulls					
	No. of heifers			0/2		0/1
	No. of steers			1		
Slaughtered	No. of bulls					
	No. of heifers					
	No. of steers		1	1		
Remarks						

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent or percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustments:

5 - Suggest S-10 scoring system; indicate if different

Production, Inventory, and Performance Data, S-10 Herds 1965-1966

State Texas

Location		McGregor	McGregor	McGregor	McGregor	McGregor
Breed of sire		G	G	G	G	G
Breed of dam		63x	13x	42x	43x	1x
Line or group ¹		Grade	Grade	Grade	Grade	Grade
Percent used in project		100	100	100	100	100
Inventory as of July 1, 1966	Cows 2 years and over	--	5	2	--	3
	Yearling heifers	1	--	1	1	1
	Bulls and steers under 1 year			2		1
	Heifers under 1 year			2		2
	Bulls over 1 year					
	Steers over 1 year				1	
Repro. perf.	Percent pregnant ²		100	0		100
	Calf survival percent ³		80			67
Wean. perf.	Adj. ADG ⁴	2.5		2.2		2.6
	Av. type sc. ⁵	--	--	--	--	--
Postweaning performance	No. of bulls					
	No. of heifers	0/1		0/2		0/1
	No. of steers					
Slaughtered	No. of bulls					
	No. of heifers					
	No. of steers			1		2
Remarks						

1 - Purebreds, grade, line, sire number, crosses, treatments, etc.

2 - Use palpation percent or percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustments:

5 - Suggest S-10 scoring system; indicate if different.

Production, Inventory, and Performance Data, S-10 Herds - 1965-1966

State Texas

Location		McGregor	McGregor	McGregor	McGregor	McGregor
Breed of sire		C	L	L	L	L
Breed of dam		9x	H	1x	9x	10x
Line or group ¹		grade	grade	grade	grade	grade
Percent used in project		100	100	100	100	100
Inventory as of July 1, 1966	Cows 2 years and over	3	3	8	1	3
	Yearling heifers	--	--	1	--	--
	Bulls and steers under 1 year		3	2		1
	Heifers under 1 year		6	6		
	Bulls over 1 year					
	Steers over 1 year			2		
Repro. perf.	Percent pregnant ²	100	67	100	100	67
	Calf survival percent ³	100	100	85	100	50
Wean. perf.	Adj. ADG ⁴		2.3	2.4		
	Av. type sc. ⁵	--	--	--	--	--
Postweaning performance	No. of bulls					
	No. of heifers		0/2	1/6		
	No. of steers		9	1		
Slaughtered	No. of bulls					
	No. of heifers					
	No. of steers			3		1
Remarks						

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent or percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustments:

5 - Suggest S-10 scoring system; indicate if different.

Production, Inventory, and Performance Data, S-10 Herds - 1965-1966

State Texas

Location		McGregor	McGregor	McGregor	McGregor	McGregor
Breed of sire		L	L	L	L	L
Breed of dam		47x	32x	66x	15x	72x
Line or group ¹		Grade	Grade	Grade	Grade	Grade
Percent used in project		100	100	100	100	100
Inventory as of July 1, 1966	Cows 2 years and over	--	--	2	1	--
	Yearling heifers	1	1	1	1	1
	Bulls and steers under 1 year			2	1	
	Heifers under 1 year	1		2	2	
	Bulls over 1 year					
	Steers over 1 year			1	1	
Repro. perf.	Percent pregnant ²			50	100	
	Calf survival percent ³			100	100	
Mean. perf.	Adj. ADG ⁴	2.7		2.6	2.5	2.1
	Av. type sc. ⁵	--	--	--	--	--
Postweaning performance	No. of bulls					
	No. of heifers	0/1		0/1	0/1	0/1
	No. of steers					
Slaughtered	No. of bulls					
	No. of heifers					
	No. of steers	1		2	1	1
Remarks						

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent or percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustments:

5 - Suggest S-10 scoring system; indicate if different.

State Texas

Location		McGregor	McGregor	McGregor	McGregor	McGregor
Breed of sire		L	L	L	BS	BS
Breed of dam		76x	77x	16x	H	1x
Line or group ¹		Grade	Grade	Grade	Grade	Grade
Percent used in project		100	100	100	100	100
Inventory as of July 1, 1966	Cows 2 years and over	2	--	6	1	25
	Yearling heifers	1	1	3	7	5
	Bulls and steers under 1 year	2		3	8	8
	Heifers under 1 year	1		4	5	10
	Bulls over 1 year					
	Steers over 1 year					1
Repro. perf.	Percent pregnant ²	50		100	100	90
	Calf survival percent ³	0		86	100	93
Wean. perf.	Adj. ADG ⁴	2.5	2.3	2.5	2.4	2.6
	Av. type sc. ⁵	--	--	--	--	--
Postweaning performance	No. of bulls					
	No. of heifers	0/2	0/1	0/4	0/7	0/5
	No. of steers				3	1
Slaughtered	No. of bulls					
	No. of heifers					
	No. of steers			5		9
Remarks						

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent or percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustments:

5 - Suggest S-10 scoring system; indicate if different.

Production, Inventory, and Performance Data, S-10 Herds - 1965-1966

State Texas

Location		McGregor	McGregor	McGregor	McGregor	McGregor
Breed of sire		L	BS	L	C	H
Breed of dam		36x	57x	82x	13x	58x
Line or group ¹						
Percent used in project						
Inventory as of July 1, 1966	Cows 2 years and over					
	Yearling heifers					
	Bulls and steers under 1 year		6	3		
	Heifers under 1 year		5	1		1
	Bulls over 1 year					
	Steers over 1 year			1		
Repro. perf.	Percent pregnant ²					
	Calf survival percent ³					
Wean. perf.	Adj. ADG ⁴	2.3	2.4	2.3	2.4	2.8
	Av. type sc. ⁵	--	--	--	--	--
Postweaning performance	No. of bulls					
	No. of heifers	1/0	4/		0/4	0/1
	No. of steers		3	1	1	1
Slaughtered	No. of bulls					
	No. of heifers			1		
	No. of steers					
Remarks						

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent or percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustments:

5 - Suggest S-10 scoring system; indicate if different.

Production, Inventory, and Performance Data, S-10 Herds - 1965-1966

State Texas

Location		McGregor	McGregor	McGregor	McGregor	McGregor
Breed of sire		H	H	L	B	G
Breed of dam		57x	1x	67x	32x	34x
Line or group ¹						
Percent used in project						
Inventory as of July 1, 1966	Cows 2 years and over					
	Yearling heifers					
	Bulls and steers under 1 year	5		3		
	Heifers under 1 year	9			1	1
	Bulls over 1 year					
	Steers over 1 year		2	1		
Repro. perf.	Percent pregnant ²					
	Calf survival percent ³					
Wean. perf.	Adj. ADG ⁴	2.7	2.6	2.9		
	Av. type sc. ⁵	--	--	--	--	--
Postweaning performance	No. of bulls					
	No. of heifers					
	No. of steers	3				
Slaughtered	No. of bulls					
	No. of heifers					
	No. of steers					
Remarks						

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent or percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustments:

5 - Suggest S-10 scoring system; indicate if different

Production, Inventory, and Performance Data, S-10 Herds - 1965-1966

State Texas

Location		McGregor				
Breed of sire		BS				
Breed of dam		BS				
Line or group ¹						
Percent used in project						
Inventory as of July 1, 1966	Cows 2 years and over					
	Yearling heifers					
	Bulls and steers under 1 year					
	Heifers under 1 year					
	Bulls over 1 year	2				
	Steers over 1 year					
Repro. perf.	Percent pregnant ²					
	Calf survival percent ³					
Wean. perf.	Adj. ADG ⁴					
	Av. type sc. ⁵					
Postweaning performance	No. of bulls					
	No. of heifers					
	No. of steers					
Slaughtered	No. of bulls					
	No. of heifers					
	No. of steers					
Remarks						

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent or percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustments:

5 - Suggest S-10 scoring system; indicate if different.

CATTLE BREED & CROSS CODES FOR TEXAS STATION

Breed or Cross	Dam Breeding	Sire Breeding	Progeny Breeding
A	Angus	Angus	Angus
B	Brahman	Brahman	Brahman
BS	Brown Swiss	Brown Swiss	Brown Swiss
C	Charbray	Charbray or Charolais	3/4, 7/8 L-1/4, 1/8 B
G	Santa Gertrudis	Santa Gertrudis	Santa Gertrudis
H	Hereford	Hereford	Hereford
L	Charolais	Charolais	Charolais
1x	Hereford	Brahman	1/2 H-1/2 B
4x	1x	Brahman	3/4 B-1/4 H
9x	Hereford	1x and 2x	3/4 H-1/4 B
10x	3x, 5x, and 9x	Charolais	1/2 L-3/8 H-1/8 B
11x	Hereford	Santa Gertrudis	1/2 H-1/2 G
13x	1x	Santa Gertrudis	1/2 G-1/4 H-1/4 B
15x	Hereford	Charolais	1/2 H-1/2 L
16x	1x and 2x	Charolais	1/2 L-1/4 H-1/4 B
23x	4x	Brahman	7/8 B-1/8 H
24x	23x	Brahman	15/16 B-1/16 H
32x	11x	Santa Gertrudis	3/4 G-1/4 H
33x	32x	Santa Gertrudis	7/8 G-1/8 H
34x	33x	Santa Gertrudis	15/16 G-1/16 H
36x	Brahman	Charbray	9/16 B-7/16 L
42x	13x	Santa Gertrudis	3/4 G-1/8 H-1/8 B
43x	42x	Santa Gertrudis	7/8 G-1/16 H-1/16 B
47x	10x	Charolais	13/16 L-3/16 H
51x	Red Poll	Santa Gertrudis	1/2 R-1/2 G
52x	51x	Santa Gertrudis	3/4 G-1/4 R
57x	1x	Brown Swiss	1/2 BS-1/4 H-1/4 B
58x	H	Brown Swiss	1/2 BS-1/2 H
61x	14x	Santa Gertrudis	1/2 G-1/4 R-1/8 H-1/8 B
62x	61x	Santa Gertrudis	3/4 G-1/8 R-1/16 H-1/16 B
63x	62x	Santa Gertrudis	7/8 G-1/16 R-1/32 H-1/32 B
66x	1x and 2x	Charbray	7/16 L-1/4 H-5/16 B
67x	66x	Charolais	3/4 L-1/8 H-1/8 B
72x	15x	Charolais	3/4 L-1/4 H
76x	3x, 5x, & 9x	Charbray	7/16 L-3/8 H-3/16 B
77x	76x	Charolais	3/4 L-3/16 H-1/16 B
82x	16x	Charolais	3/4 L-1/8 H-1/8 B

VIRGINIA POLYTECHNIC INSTITUTE
Agricultural Experiment Station
Blacksburg, Virginia

I. PROJECT: S-031-8 (S-10)

Evaluation of the Effectiveness of Selection for Economic Traits in Beef Cattle

II. OBJECTIVES:

To obtain estimates of genetic parameters from field data to include:

- a. heritability and repeatability of traits,
- b. phenotypic and genetic correlations, and
- c. construction of selection indexes.

To study the effects of location on performance record and on adjustment factors needed.

To determine the minimum gains required to obtain measurable genetic difference among animals.

To study the factors influencing performance and sale price of ROP bulls.

To evaluate the effectiveness of selection on the improvement of beef cattle under farm conditions.

III. PERSONNEL:

T. J. Marlowe, R. R. Schalles, D. W. Vogt and T. N. Meacham

IV. ACCOMPLISHMENTS DURING THE YEAR:

The first crop of 54 calves from 12 sires in the comparison of contemporary progenies of two groups of Culpeper ROP bulls with birth dates differing by five or more years are now on the ground. Approximately 70 cows are rebred to a new set of bulls. Semen was collected from 12 to 15 Hereford bulls that went through the 1959 or 1960 ROP test and a similar number of bulls that went through the 1964 or 1965 test. This semen is being used to breed approximately 110 commercial Hereford cows each year for three or four years. These temporary comparisons are being made in an effort to measure the progress in Hereford herds that have been in the performance testing program for several years.

A similar comparison of Angus bulls going through the Culpeper ROP test is being started this year with approximately 100 Angus cows. Only about 20 cows have been bred to date.

Data on 997 bulls performance tested either at Culpeper or at Front Royal were analyzed to determine the effect of several factors on ROP test performance, 365-day weight, lifetime performance and end of test grade. Factors included breed, sire within breed, year, dwarfism status of the pedigree, age of dam, starting test age, pretest average daily gain, and selected interactions. Hereford and Shorthorn bulls generally excelled

Angus bulls in rate of gain and 365-day weight. Sire within breed effect had a significant influence on all four traits. There was a significant positive relationship between masculinity development and end of test grade. Bulls from older cows tended to gain faster and weigh more at 365 days of age. As the preweaning grade increased, the end of test grade also increased but rate of gain and 365-day weight decreased. The older the bull at the beginning of the ROP test, the higher was his end of test grade and ROP test gain. Bull calves which grew fastest up to the start of the test made the fastest gains on test and had the highest lifetime gain and 365-day weight.

Observations were recorded on 1371 cows in 13 BCIA member herds of Angus cows. The observations recorded were weight, grade, condition score, nursing status and season. The data were analyzed to estimate the effects of these non-genetic sources of variation on weight, grade and condition of beef cows; to estimate the heritability of weight, grade and condition; and to estimate the genetic, phenotypic and environmental correlations between weight, grade and condition. Four models (three using paternal half-sib analyses and one using dam-offspring regression analysis) were used to estimate heritability. Estimates from the three models using paternal half-sib analysis were: $.38 \pm .11$, $.29 \pm .11$, and $.56 \pm .11$ for weight. Corresponding values for grade were $.49 \pm .11$, $.43 \pm .11$, and $.67 \pm .11$. In one model, the heritability of condition was estimated as $.31 \pm .11$. The intra-sire regression of offspring on dam analysis included 198 dam-daughter pairs and gave an estimate of $.22 \pm .14$ for weight and $.10 \pm .06$ for grade. The genetic correlation between weight and grade ranged from $.33 \pm .12$ to $.60 \pm .18$; phenotypic correlation from .21 to .40 and the environmental correlation from .01 to .29.

V. FUTURE PLANS:

Continuation of comparisons of contemporary progeny from Culpeper performance tested bulls with birth dates varying five or more years in both the Angus and Hereford breeds until sufficient data is accumulated to determine the progress being made in these BCIA herds; also, a study of factors that influence the sale price of these performance tested bulls.

VI. PUBLICATIONS DURING THE YEAR:

Schalles, R. R. and T. J. Marlowe. 1965. Factors Affecting ROP Test Performance of Beef Bulls. J. Animal Sci. 24:851 (abstr.).

Schalles, R. R. 1965. Factors Affecting Test Performance of Beef Bulls. M. S. Thesis, Virginia Polytechnic Institute.

Morrow, G. A. 1966. Heritability Estimates and Genetic, Phenotypic and Environmental Correlations Between Weight, Grade and Condition of Angus Cows. Ph.D. dissertation, Virginia Polytechnic Institute.

I. PROJECT: Hatch 93901. Line Project No. AH dl-7 (rev. #2)

Heterosis from Crosses among British Breeds of Beef Cattle

II. OBJECTIVES:

To measure heterosis obtained from crosses among the Angus, Hereford, and Short-horn breeds, as shown by growth rate, fattening ability, and carcass quality.

To measure productive ability of crossbred versus purebred dams.

III. PERSONNEL:

J. A. Gaines, W. H. McClure, R. C. Carter, G. W. Litton, and F. S. McClaugherty

IV. ACCOMPLISHMENTS DURING THE YEAR 1965:

The third calf crop in phase two was born approximately January to April of 1965, and weaned in October 1965. After an adjustment period, they were put on full feed in groups in dry lot on fattening rations.

This year's report will be a summary of phase two to date, in order to give a more comprehensive report that may be a source of information to other entities.

The objective of phase two of this experiment is to compare the productivity of purebred and crossbred cows in terms of percentage calf crop born and weaned, birth and weaning weights of the calves, as well as their postweaning performance. The cow herd, consisting of sixty purebreds (Angus, Hereford, and Shorthorn), and sixty crossbreds (reciprocal two-breed crosses) among these three breeds, was purchased as calves in 1960. Contracts were made with six breeders to mate a random one-half of each herd to a bull of a different breed and half to a bull of the same breed. Thus both purebred and crossbred heifers came from each of six herds.

The heifers were bred first, as two-year-olds, in 1962. Six bulls were used the first year; twelve bulls were used the second and third years. Bulls used each year were two purebreds of each of the Angus, Hereford, and Short-horn breeds, and two crossbreds of each of the crosses Angus x Hereford, Angus x Shorthorn, and Hereford x Shorthorn (or the reciprocals). The crossbred bulls were bred to the purebred cows and the purebred bulls to the crossbred cows. Thus all calves were either three-breed or backcrosses. All bull calves were castrated soon after birth.

This report is based on results from three calf crops, except postweaning data on the steers (based on two calf crops). The total number of matings involved is 359. The average birth date of 168 calves from purebred dams was 18 Feb.; it was 16 Feb. for 171 calves from crossbred dams (table 1). Bull calves from purebred dams weighed 33.0 kg. at birth; those from crossbred dams weighed 34.2 kg. Heifer calves from purebred dams weighed 31.5 kg. at birth; those from crossbred dams weighed 31.8 kg. (table 1). From 180 matings of purebred cows, 93.3% calved and 89.9% weaned calves; from 179 matings of crossbred cows, 95.5% calved and 92.7% weaned calves (tables 2 and 3).

Steers from purebred dams weighed 191.9 kg. at weaning; those from crossbred dams weighed 202.3 kg. Heifers from purebred dams weaned at 184.2 kg.; those from crossbred dams weighed 197.3 kg. There was only two days difference between the ages of calves from purebred cows and calves from crossbred cows (table 4). Feeder grade at weaning was low choice for all groups (table 5).

With respect to postweaning performance, data accumulated thus far show that 55 steers from purebred dams gained 993 gm./day on full feed, graded low choice alive before slaughter, and graded high choice in the carcass. The slaughter weight of these steers was 402.8 kg., the carcass weight was 243.6 kg., and the dressing percent was 60.3. The 52 steers from crossbred dams gained 1030 gm./day on feed and graded low choice before slaughter and in the carcass; their slaughter weight was 424.6 kg., carcass weight was 252.7 kg., and dressing percent was 59.7 (tables 6 and 8).

Seventy-one heifers from purebred dams gained 896 gm./day on feed, and graded low choice before slaughter and in the carcass; their slaughter weight was 341.1 kg., carcass weight was 200.9 kg., and dressing percent was 58.7. 69 heifers from crossbred dams gained 906 gm./day on feed, and graded low choice before slaughter and in the carcass; their slaughter weight was 355.2 kg., carcass weight was 209.1 kg., and dressing percent was 58.9 (tables 7 and 9).

(1) crossbred cows weaned 2 to 3 percent more calves than purebred cows, (2) weaning weights of steer calves were 22 lb. in favor of crossbred dams, and weaning weights of heifer calves were 29 lb. in favor of crossbred dams, (3) steer calves from crossbred cows weighed 48 lb. more at time of slaughter and had heavier carcasses by 20 lb., when compared to steers from purebred cows, (4) heifer calves from crossbred cows weighed 29 lb. more at time of slaughter and had heavier carcasses by 18 lb., when compared to heifer calves from purebred cows. Other differences were small. (AH d1-7)

V. FUTURE PLANS:

Phase two will be continued as approved.

Table 1. Birth Dates and Weights

Breeding of Dams	Av. Birth Date	Av. Birth Weight, kg.	
		Males	Females
Purebred	18 Feb.	33.0	31.5
Crossbred	16 Feb.	34.2	31.8

Difference	2 days	1.2	0.3

Table 2. Cows Bred, Cows Calving, Calves Born and Calves Alive at 36 Hours

Breeding of Dams	Cows Bred	Cows Calving		Alive at 36 Hours
		No.	%	
Purebred	180	168	93.3	167
Crossbred	179	171	95.5	169

Difference			2.2	2

Table 3. Calves Weaned of Cows Bred

Breeding of Dams	Cows Bred	Calves Weaned	Calves Weaned of Cows Bred, %
Purebred	179	161	89.9
Crossbred	178	165	92.7
Difference			2.8

Table 4. Ages and Weaning Weights

Breeding of Dams	Av. Age at Weaning	Weaning Weight, kg.	
		Steers	Heifers
Purebred	229 days	191.9	184.2
Crossbred	231 days	202.3	197.3
Difference		10.4	13.1

Table 5. Feeder Grade at Weaning

Breeding of Dams	Feeder Grade	
	Steers	Heifers
Purebred	11.5	12.0
Crossbred	12.0	12.1

Grade Code: Choice, 12; Good Plus, 11.

Table 6. Post-Weaning Data on Steers

Breeding of Dams	No. Fed	Daily Gain, gm.	Slau. Grade	Carcass Grade
Purebred	55	993	12.0	12.6
Crossbred	52	1030	12.3	11.6
Difference		37	0.3	1.0

Table 7. Post-Weaning Data on Heifers

Breeding of Dams	No. Fed	Daily Gain, gm.	Slau. Grade	Carcass Grade
Purebred	71	896	11.9	11.9
Crossbred	69	906	12.1	11.7
Difference		10	0.2	0.2

Table 8. Post-Weaning Data on Steers

Breeding of Dams	No. Fed	Slaughter Weight, kg.	Carcass Weight, kg.	Dressing Percent
Purebred	55	402.8	243.6	60.3
Crossbred	52	424.6	252.7	59.7

Difference		21.8	9.1	0.6

Table 9. Post-Weaning Data on Heifers

Breeding of Dams	No. Fed	Slaughter Weight, kg.	Carcass Weight, kg.	Dressing Percent
Purebred	71	341.1	200.9	58.7
Crossbred	69	355.2	209.1	58.9

Difference		14.1	8.2	0.2

VI. PUBLICATIONS DURING THE YEAR:

Gaines, J. A., W. H. McClure, D. W. Vogt, R. C. Carter and C. M. Kincaid. 1966. Heterosis from crosses among British breeds of beef cattle: fertility and calf performance to weaning. *J. Animal Sci.* 25:5-13.

Richardson, G. V., R. C. Carter, J. A. Gaines and D. W. Vogt. 1965. Heterosis in carcass characteristics from breed crossing in beef cattle. (abstract). *J. Animal Sci.* 24:851.

Richardson, G. V., D. W. Vogt and J. A. Gaines. 1965. Heterosis in carcass characteristics from breed crossing in beef cattle. (abstract). *Va. J. of Sci.* 16:311.

VII. PUBLICATIONS PLANNED:

Vogt, D. W., J. A. Gaines, R. C. Carter, W. H. McClure and C. M. Kincaid. Heterosis from crosses among British breeds of beef cattle: postweaning performance to slaughter.

An abstract has been submitted to the J. Animal Sci. for presentation at the 1966 annual meetings.

Submitted by: J. A. Gaines

Production, Inventory, and Performance Data, S-10 Herds - 1965-1966

State Virginia

Project 93901, phase 2, third calf crop

Location		Shen. Valley	Res. Sta.	Steeles Tavern, Va.	
Breed of sire		Purebred	Purebred	Crossbred	Crossbred
Breed of dam		Crossbred	Crossbred	Purebred	Purebred
Line or group ¹		Backcross	3-breed cross	Backcross	3-breed cross
Percent used in project		100	100	100	100
Inventory as of July 1, 1966	Cows 2 years and over	29	30	30	29
	Yearling heifers	0	0	0	0
	Bulls and steers under 1 year	12	14	12	16
	Heifers under 1 year	18	10	14	13
	Bulls over 1 year	3	3	3	3
	Steers over 1 year	0	0	0	0
Repro. perf.	Percent pregnant ²	96.7	89.7	93.1	103.3
	Calf survival percent ³	100	100	92.6	100
Wean. perf.	Adj. ADG ⁴	1.68 1.45	1.70 1.52	1.69 1.59	1.62 1.61
	Av. type sc. ⁵	12.0	12.2	12.4	11.2
		12.4	11.8	12.3	12.3
Postweaning performance	No. of bulls	0	0	0	0
	No. of heifers	18	10	14	13
	No. of steers	11	13	10	16
Slaughtered	No. of bulls	0	0	0	0
	No. of heifers	18	10	14	13
	No. of steers*	11	13	10	16
Remarks		*Due to be slaughtered 19 May 1966.			

- 1 - Purebreds, grade, line, sire number, crosses, treatment, etc.
- 2 - Use palpation percent or percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.
- 3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.
- 4 - Indicate adjustments: None
- 5 - Suggest S-10 scoring system; indicate if different.

BEEF CATTLE RESEARCH STATION
Front Royal, Virginia

I. PROJECT: AH 150.16, AH Line Project dl-4 (S-10)

The Improvement of Beef Cattle for Virginia Through Breeding Methods

II. OBJECTIVES:

Beef cattle research projects are conducted with three breeds of cattle (Angus, Hereford, and Shorthorn) and are associated with problems relating to the improvement of beef cattle for Virginia through breeding methods.

The objectives of the investigation are as follows:

To estimate the progress to be expected from mass selection as compared with family selection in the improvement of beef cattle.

To evaluate selection criteria and procedures and develop more precise and effective measures of quality and performance in beef cattle.

To simplify methods of progeny of sib testing whereby breeding cattle can be evaluated at comparatively young ages.

The long-term breeding program for the work at Front Royal may be roughly sub-divided into five phases, each of which has some direct bearing on the main objectives stated above:

(1) Test from weaning to yearling age those bull calves which appear to be herd-sire prospects on the basis of their preweaning performance.

(2) Progeny test as yearlings those bulls with favorable records from Phase 1.

(3) Choose as foundation sires those bulls with good records from Phases 1 and 2. Obtain 32 daughters by each foundation sire and out of unrelated cows.

(4) Allot 32 daughters from each foundation sire as follows: 16 are placed back with their sire to form an inbred line; 8 become a part of a growth herd where selection emphasis is on growth; and 8 become part of a type herd where selection emphasis is on type. For each breeding plan, measure the progress in terms of changes in growth rate and conformation. Compare the actual results with those expected from theoretical consideration.

(5) Test inbred lines for combining ability and outcross performance.

III. PERSONNEL:

B. M. Priode, K. P. Bovard, R. C. Carter, E. J. Warwick, and R. S. Temple

IV. ACCOMPLISHMENTS DURING THE YEAR:

1 - Scope and nature of work undertaken

- (a) Topcross testing of the six Angus lines -- four inbred and two selection -- began in a cooperative project with the Mississippi station.
- (b) Twelve of the most highly inbred cows in each of six inbred lines -- two Angus, two Hereford, and two Shorthorn -- were placed in special matings in 1965. Four were mated to the sire of the other inbred line of their breed, and two each to sires of the other four inbred lines, two each from the other two breeds. The matings were made primarily to produce line- and breed-cross bulls of known genetic constitution for later use in crossbreeding studies. Data may be useful as preliminary partial diallel test cross results.
- (c) All cattle in the station records, including the current inventory, have been assigned a generation code. It is traced through the female side to a (generation zero) foundation daughter of one of the four foundation sires in each breed. Some Shorthorns are now in generation five, some Angus in generation four, but few Herefords are in or beyond the second generation.
- (d) A heptachlor residue study with steers was initiated in June 1965.

2 - Research results

- (a) Conception rates of the 1964 breeding herds were examined by breed, age, lactation, mating system, and previous year's breeding record, as shown in the accompanying table.

At the Front Royal station, the heavy two-thirds of the yearling heifers are bred to calve first as two's while the lightweight one-third are bred to calve first as three's. Conception rates of the inbreds compared favorably with those of non-inbreds, except among lightweights bred first as two's, column E. where they were 10% lower. Also, wet cows, columns A and B, had an 86% conception rate. This was about 18% better than their dry counterparts, columns C and D, with an otherwise similar breeding history.

- (b) The effects of vitamin A on stillbirths, survival, and average daily gains to weaning of 1964 calves were summarized as shown on the attached table. Results did not clearly show a response to vitamin A when added (a) to dam's ration during late pregnancy and early lactation, (b) as an injection to the calf at birth, or (c) in both forms. Because the previous year's vitamin A comparisons showed a clear-cut advantage in survival, but none in ADG, and because the weather during this year's calving season -- 6-8 weeks later than in 1963 -- was much more favorable, the past year's work will be repeated in 1965-66.
- (c) Two Hereford hydrocephalic calves, 5062 male and 5188 female, were born in March 1965, both in the H-7 line, but by different sires which were maternal half-sibs. X-ray pictures and black and white photographs were taken of both calves.

- (d) An analysis of spring and fall weights of 493 cows in 1964 showed that (1) dry cows gained approximately 75 lbs. more than wet ones, (2) cows pregnant in October gained about 38 lbs. more than open cows during the preceding summer, and (3) absolute effects of inbreeding on gains were much smaller, but statistically significant, as shown below.

L.S. results from analysis of summer gains, and fall weights of cows in 1964 breeding herds.

Breed	N	Age, yrs.	Fx, %	Summer gain, lbs.	Fall wt., lbs.	Status	
						Pregnancy ^a	Lactation ^b
Angus	169	4.3	9.6	78	971	-19**	21**
Shorthorn	159	3.7	11.9	98	972	-24**	44**
Hereford	165	3.3	2.5	112	985	-14	50**
Total or Average	493	3.8	8.0	96	976	-19	38

^a Values shown are for (Not preg. - μ); thus, (Preg. -Not preg.) is twice tabulated estimate.

^b Values are for (Not lactation - μ).

- (e) Least squares analyses of Hereford calf performance to weaning were completed in late June. Most results are in line with expectations. Each of the main effects, i.e., years, sex, and age of dam, and certain 2-way interactions had important and statistically highly significant effects upon 9 different dependent variables, as shown in the table attached, with the following exceptions: relatively unimportant were the following effects; years on type scores at all ages; sex on birth type score; age of dam on type score and ADG at midsummer, fall type score; age of dam x year interaction on birth weight and type score, and on ADG to fall; and regression on age in days (i.e., season of birth) on type score at birth and in the fall.

V FUTURE PLANS:

1. A study of heptachlor residues in pregnant beef cows, and in their subsequent offspring, will be initiated in November, 1966.

VI. PUBLICATIONS:

- Putnam, P. A., K. P. Bovard, B. M. Priode and R. Lehmann. 1965. Rumen volatile fatty acids and gains of record of performance bulls. J. Animal Sci. 24(1):166-167.
- Bovard, K. P. and B. M. Priode. 1965. Snorter dwarfism in an Angus inbred line. J. Hered. 56:243-246.

Bovard, K. P. and B. M. Priode. 1965. Summer gains and fall weights of beef cows in 1964 as affected by pregnancy status, lactation status, age and inbreeding. Paper presented to 43rd annual meeting of Virginia Academy of Science, Richmond, Va., May 7, 1965.

VII. PUBLICATIONS PLANNED:

Bovard, K. P., R. H. Miller and B. M. Priode. Selection differences in beef calves' type and growth. Planned for presentation at the American Society of Animal Science meeting in New Brunswick, New Jersey, July 31 - August 4, 1966.

Submitted by B. M. Priode and
K. P. Bovard

1964 conception rates by breed, age, lactation status, mating system and previous year's breeding record.
Beef Cattle Research Station, Front Royal, Virginia.

Lactation Status Bred, 1963? Age, 1964:		WET			DRY					TOTAL	
		YES			NO					Ave.	
		> 2			> 2					1	
		2 A ^a	2 B	n-P	n-P	n-P	n-P	n-P	n-P	P	n-P
Breed	Mating System	b ^b -p ^c									
A	Inb'd.	6- .83	50- .86		0-	8- .62	5- .80	9- .78	.73	78- .82	
	Sel'n.	10- .80	38- .95		1- .00	3- .67	8- .62	21- .90	.79	81- .86	
	Test		1- .00							1- .00	
	Ave.	16- .81	89- .89		1- .00	11- .64	13- .69	30- .87	.76	160- .84	
H	Inb'd.	4-1.00	37-1.00	1.00	1-1.00	5- .40	8- .88	12- .67	.69	67- .88	
	Sel'n.	6-1.00	45- .89	.90	0- --	8- .50	18- .89	13- .92	.82	90- .87	
	Ave.	10-1.00	82- .94	.95	1-1.00	13- .46	26- .88	25- .80	.77	157- .87	
S	Inb'd.	9- .89	32- .88	.88	3- .33	16- .94	6- .50	10-1.00	.83	76- .86	
	Sel'n.	17- .71	33- .67	.68	6- .83	3- .67	5-1.00	16- .75	.80	80- .72	
	Ave.	26- .77	65- .77	.77	9- .67	19- .89	11- .73	26- .85	.82	156- .79	
Ave	Inb'd.	19- .89	119- .91	.91	4- .50	29- .76	19- .74	31- .81	.76	221- .85	
	Sel'n.	33- .79	116- .84	.83	7- .71	14- .57	31- .84	50- .86	.80	251- .82	
	Test		1- .00	.00						1- .00	
	All	52- .83	236- .87	.86	11- .64	43- .70	50- .80	81- .84	.78	473- .83	

^a A-F = column heading such that A+C = heavy weight 1962♀♀, bred '63; E = light weight 1962♀♀, not bred '63; F = heavy weight 1963♀♀, bred '64.

^b n = number bred

^c P = fraction pregnant

Effects of supplemental vitamin A received (1) through dam's ration in late gestation and early lactation, (2) as a calfhood injection at birth, (3) in both forms, and (4) in neither form on: fraction of stillbirths, table 6A; fraction dying among total livebirths, table 6B; and observed ADG to weaning of 1964 calves, table 6C. Beef Cattle Research Station, Front Royal, Virginia.

Number of stillbirths/total born, dead and alive.

Sex	Mating System	Dams:		A		No A		A	No A	Inj.	Not inj.	All
		Inj.	Calves:	Inj.	Not inj.	Inj.	Not inj.					
Male	Inb'd.	0/24		1/14	5/21	0/14	5/35	1/38	5/35	0/38	6/35	6/73
	Sel'n.	0/22		1/24	0/19	0/19	0/38	1/46	0/38	0/41	1/43	1/84
	All ♀♀	0/46		2/38	5/36	0/33	5/73	2/84	5/73	0/79	7/78	7/157
Female	Inb'd.	0/16		0/17	1/19	0/18	1/37	0/33	1/37	0/34	1/36	1/70
	Sel'n.	0/12		1/17	0/20	0/20	0/40	1/29	0/40	0/32	1/37	1/69
	All ♀♀	0/28		1/34	1/39	0/38	1/77	1/62	1/77	0/66	2/73	2/139
All inbred		0/40		1/31	6/40	0/32	6/72	1/71	6/72	0/72	7/71	7/143
All selection		0/34		2/41	0/39	0/39	0/78	2/75	0/78	0/73	2/80	2/153
Total		0/74		3/72	6/79	0/71	6/150	3/146	6/150	0/145	9/151	9/296

Number of calves dying before weaning/number of live births.

Male	Inb'd.	1/24	1/13	1/14	0/16	2/37	1/30	2/38	1/29	3/67
	Sel'n.	1/22	1/23	1/19	0/19	2/45	1/38	2/41	1/42	3/83
	All ♀♀	2/46	2/36	2/33	0/35	4/82	2/68	4/79	2/71	6/150
Female	Inb'd.	0/16	0/17	1/18	3/18	0/33	4/36	1/34	3/35	4/69
	Sel'n.	1/12	2/16	1/20	1/20	3/28	4/40	2/32	3/36	5/68
	All ♀♀	1/28	2/33	2/38	4/38	3/61	6/76	3/66	6/71	9/137
All inbred		1/40	1/30	2/32	3/34	2/70	5/66	3/72	4/64	7/136
All selection		2/34	3/39	2/39	1/39	5/73	3/78	4/73	4/68	8/151
Total		3/74	4/69	4/61	4/73	7/143	8/154	7/145	8/142	15/287

Observed ADG to weaning.

Sex	Mating System	Dams: Calves:	A		No A		A		No A		Inj.	Not inj.	All
			Inj.	Not inj.	Inj.	Not inj.	N-ADG	N-ADG	N-ADG	N-ADG			
Male	Inb'd.		23-1.83	12*-1.63	13-1.68	16-1.74	35-1.73	29-1.71	36-1.75	28-1.68			64-1.72
	Sel'n.		21-1.95	22-1.97	18-1.85	19-1.89	43-1.96	37-1.87	39-1.90	41-1.98			80-1.92
	All ♂♂		44-1.89	34-1.80	31-1.76	35-1.82	78-1.84	66-1.79	75-1.82	69-1.80			144-1.82
Female	Inb'd.		16-1.69	17-1.50	17*-1.60	15-1.69	33-1.59	32-1.65	33-1.64	32-1.59			65-1.62
	Sel'n.		11-1.63	14-1.48	19*-1.50	19-1.57	25-1.56	38-1.53	30-1.57	33-1.53			63-1.54
	All ♀♀		27-1.66	31-1.49	36-1.55	34-1.63	58-1.58	70-1.59	63-1.60	65-1.56			128-1.58
	All inbred		39-1.76	29-1.56	30-1.64	31-1.72	68-1.66	61-1.68	69-1.70	60-1.64			129-1.67
	All selection		32-1.79	36-1.72	37-1.68	38-1.73	68-1.76	75-1.70	69-1.74	74-1.73			143-1.73
Total			71-1.78	65-1.64	67-1.66	69-1.72	136-1.71	136-1.69	138-1.71	134-1.68			272*1.70

* Count includes one calf whose ADG was excluded.

** Does not include 4141 MA9, 4701 MX9, and 4704 MX9.

F values from least squares analyses of B/W data on 483 Hereford calves born 1950-1963. Beef Cattle Research Station, Front Royal, Va.

F Values												
Source of Variation	d.f.	Tabulated ^a	Observed									M/F ^c ADG
			Birth		Midsummer			Fall			TS	
			Wt.	TS ^b	Wt.	ADG	TS	Wt.	ADG	TS		
Year	9	2.6	2.6	1.5	6.5	8.0	2.6	4.7	4.7	2.0	5.4	
Sex	1	6.7	32.3	17.1	32.0	29.3	1.6	84.3	86.6	10.5	112.4	
Age of dam	3	3.8	13.9	5.6	9.2	9.6	2.5	9.2	7.9	2.4	3.2	
Year x sex	9	2.5	d	d	d	d	d	4.9	4.9	.6	13.5	
Age cf dam x year	13	2.2	1.1	.5	3.7	3.9	4.2	2.4	2.5	2.3	.8	
Regr. on age (days)	1	6.7	11.9	4.2	631.4	18.8	16.9	316.2	8.1	6.1	8.7	

^a Tabular values for statistical significance, $P < .01$, for d.f. _____, 400.

^b Type score

^c Midsummer to fall

^d Year x sex interaction not significant in preliminary analyses, therefore not included in these analyses.

Production, Inventory, and Performance Data, S-10 Herds - 1965-1966

State Virginia

Location		Front Royal				
Breed of sire		Angus	Angus	Angus	Angus	Angus
Breed of dam		Angus	Angus	Angus	Angus	Angus
Line or group ¹		A1	A2	A3	A4	A7
Percent used in project		100	100	100	100	100
Inventory as of July 1, 1966	Cows 2 years and over	20	21	20	16	30
	Yearling heifers	6	7	0	4	14
	Bulls under 1 year	2	4	7	2	13
	Heifers under 1 year	5	5	7	7	14
	Bulls over 1 year	3	3	3	3	3
	Steers over 1 year	-	-	-	-	-
Repro. perf.	Percent pregnant ²	84	86	94	67	77
	Calf survival percent ³	94	100	88	83	89
Wean. perf.	Adj. ADG ⁴	1.88	1.86	1.70	1.64	1.98
	Av. type sc. ⁵	12.4	11.8	10.2	11.2	12.5
Postweaning performance	No. of bulls	3	5	4	2	5
	No. of heifers	6	7	1	4	14
	No. of steers	-	-	-	-	-
Slaughtered	No. of bulls	-	-	-	-	-
	No. of heifers	-	-	-	-	-
	No. of steers	-	-	-	-	-
Remarks						

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent or percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustments: age of dam, season of birth, sex, creep vs. no creep.

5 - Suggest S-10 scoring system; indicate if different.

Production, Inventory, and Performance Data, S-10 Herds - 1965-1966

State Virginia

Location		Front Royal				
Breed of sire		Angus	Angus	Angus	Hereford	Hereford
Breed of dam		Angus	Angus	Angus	Hereford	Hereford
Line or group ¹		A8	A9	Total	H2	H3
Percent used in project		100	100	100	100	100
Inventory as of July 1, 1966	Cows 2 years and over	30	-	137	21	22
	Yearling heifers	10	-	41	4	8
	Bulls under 1 year	13	4	45	4	4
	Heifers under 1 year	15	3	56	1	0
	Bulls over 1 year	3	0	18	2	2
	Steers over 1 year	-	-	-	-	-
Repro. perf.	Percent pregnant ²	85		82	88	94
	Calf survival percent ³	93		92	71	100
Wean. perf.	Adj. ADG ⁴	2.04		1.85	1.54	1.67
	Av. type sc. ⁵	12.2		11.7	10.7	10.0
Postweaning performance	No. of bulls	6	4 ⁶	29	2	2
	No. of heifers	10	-	42	4	8
	No. of steers	-	-	-	-	-
Slaughtered	No. of bulls	-	-	-	-	-
	No. of heifers	-	-	-	-	-
	No. of steers	-	-	-	-	-
Remarks						

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent or percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustments: Age of dam, season of birth, sex, creep vs. no creep.

5 - Suggest S-10 scoring system; indicate if different.

6 - Bulls on ROP test from outside breeders.

State Virginia

Location		Front Royal			
Breed of sire		Hereford	Hereford	Hereford	Hereford
Breed of dam		Hereford	Hereford	Hereford	Hereford
Line or group ¹		H4	H5	H6	H7
Percent used in project		100	100	100	100
Inventory as of July 1, 1966	Cows 2 years and over	20	16	29	33
	Yearling heifers	3	4	10	7
	Bulls under 1 year	6	6	9	6
	Heifers under 1 year	5	7	12	13
	Bulls over 1 year	2	2	2	2
	Steers over 1 year	-	-	-	-
Repro. perf.	Percent pregnant ²	81	88	89	81
	Calf survival percent ³	92	86	80	90
Wean. perf.	Adj. ADG ⁴	1.74	1.63	1.67	1.86
	Av. type sc. ⁵	11.6	11.6	12.4	12.0
Postweaning performance	No. of bulls	2	2	3	4
	No. of heifers	3	4	10	7
	No. of steers	-	-	-	-
Slaughtered	No. of bulls	-	-	-	-
	No. of heifers	-	-	-	-
	No. of steers	-	-	-	-
Remarks					

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent or percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustments: age of dam, season of birth, sex, creep vs. no creep.

5 - Suggest S-10 scoring system; indicate if different.

Production, Inventory, and Performance Data, S-10 Herds - 1965-1966

State Virginia

Location		Front Royal				
Breed of sire		Hereford	Hereford	Shorthorn	Shorthorn	Shorthorn
Breed of dam		Hereford	Hereford	Shorthorn	Shorthorn	Shorthorn
Line or group ¹		H9	Total	S1	S2	S4
Percent used in project		100	100	100	100	100
Inventory as of July 1, 1966	Cows 2 years and over	-	179	17	15	17
	Yearling heifers	-	47	6	5	2
	Bulls under 1 year	3	55	4	7	7
	Heifers under 1 year	2	51	1	3	4
	Bulls over 1 year	0	14	3	3	3
	Steers over 1 year	-	-	-	-	-
Repro. perf.	Percent pregnant ²		87	76	89	69
	Calf survival percent ³		88	85	50	73
Wean. perf.	Adj. ADG ⁴		1.70	1.80	1.57	1.81
	Av. type sc. ⁵		11.4	10.2	11.0	13.0
Postweaning performance	No. of bulls	4 ⁶	21	4	2	3
	No. of heifers		47	6	5	2
	No. of steers	-	-	-	-	-
Slaughtered	No. of bulls	-	-	-	-	-
	No. of heifers	-	-	-	-	-
	No. of steers	-	-	-	-	-
Remarks						

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent or percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustments: age of dam, season of birth, sex, creep vs. no creep.

5 - Suggest S-10 scoring system; indicate if different.

5 - Bulls on ROP test from outside breeders.

State Virginia

Location		Front Royal				
Breed of sire		Shorthorn	Shorthorn	Shorthorn	Shorthorn	Shorthorn
Breed of dam		Shorthorn	Shorthorn	Shorthorn	Shorthorn	Shorthorn
Line or group ¹		S5	S7	S8	S9	Total
Percent used in project		100	100	100	100	100
Inventory as of July 1, 1966	Cows 2 years and over	20	37	31	-	137
	Yearling heifers	3	4	11	-	31
	Bulls under 1 year	2	13	17	1	51
	Heifers under 1 year	0	16	12	1	37
	Bulls over 1 year	2	3	3	0	17
	Steers over 1 year	-	-	-	-	-
Repro. perf.	Percent pregnant ²	74	52	78		70
	Calf survival percent ³	67	81	88		75
Wean. perf.	Adj. ADG ⁴	1.56	1.82	1.96		1.75
	Av. type sc. ⁵	11.2	13.4	12.0		11.8
Postweaning performance	No. of bulls	3	3	4	5 ⁶	24
	No. of heifers	3	4	11	-	31
	No. of steers	-	-	-	-	-
Slaughtered	No. of bulls	-	-	-		-
	No. of heifers	-	-	-		-
	No. of steers	-	-	-		-
Remarks						

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent or percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustments: age of dam, season of birth, sex, creep vs. no creep.

5 - Suggest S-10 scoring system; indicate if different.

6 - Bulls on ROP test from outside breeders.

Production, Inventory, and Performance Data, S-10 Herds - 1965-1966

State Virginia

Location		Front Royal			
Breed of sire		Purebred	Various		
Breed of dam		Purebred	Various		
Line or group ¹		Herd Total	Crossbred		
Percent used in project		100	100		
Inventory as of July 1, 1966	Cows 2 years and over	453	-		
	Yearling heifers	119	-		
	Bulls under 1 year	151	16		
	Heifers under 1 year	144	25		
	Bulls over 1 year	49	-		
	Steers over 1 year	-	-		
Repro. perf.	Percent pregnant ²	80	100		
	Calf survival percent ³	86	100		
Wean. perf.	Adj. ADG ⁴	1.77	1.89		
	Av. type sc. ⁵	11.6	11.4		
Postweaning performance	No. of bulls	74	-		
	No. of heifers	120	-		
	No. of steers	-	-		
Slaughtered	No. of bulls	-	-		
	No. of heifers	-	-		
	No. of steers	-	-		
Remarks					

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent or percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustments: age of dam, season of birth, sex, creep vs. no creep.

5 - Suggest S-10 scoring system; indicate if different.

